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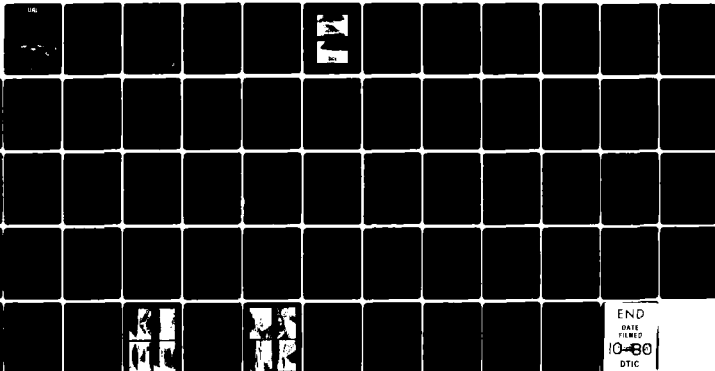
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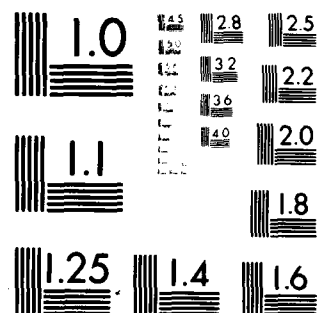
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GARRETT COUNTY

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MARYLAND

LITTLE YOUGHIOGHENY RIVER SITE NO. 1

⑩ James David/Hainley
Timothy E. Debes

JNDI I.D. NO. MD 44

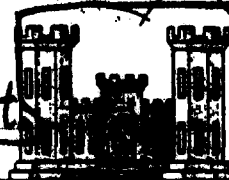
PHASE I INSPECTION REPORT

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NATIONAL DAM INSPECTION PROGRAM

Little Youghiogheny River Site Number 1
(NDI I.D. Number MD-44) Ohio River Inc.
Cherry Glade Run, Garrett County,
Maryland.

Phase I Inspection Report



PREPARED FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
BALTIMORE, MARYLAND 21203

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BY DACW 31-79-C-0038

ACKENHEIL & ASSOCIATES, BALTIMORE, MD, INC.
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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase 1 investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase 1 investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon visual observations and review of available data. Detailed investigation and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase 1 investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase 1 inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" (PMF) for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

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PHASE 1 REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Little Youghiogheny Site No. 1
STATE LOCATED: Maryland
COUNTY LOCATED: Garrett
STREAM: Cherry Glade Run, a tributary of the Little Youghiogheny River
DATES OF INSPECTION: April 11, 1979, and May 24, 1979
COORDINATES: Lat. 39° 24.8', Long. 79° 24.0'

ASSESSMENT OF GENERAL CONDITIONS: Based on the evaluation of available design information and visual observations of conditions as they existed on the dates of the field reconnaissances, the general condition of Little Youghiogheny Site No. 1 is considered to be good.

The wet zone located downstream of the embankment toe is not considered to present significant hazard to dam stability. This wet zone is not believed to be the result of seepage emanating from the dam embankment or foundation.

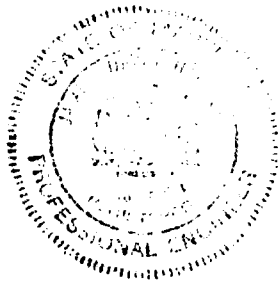
The reservoir drain gate valve is inoperable and judged inadequate in its present condition. Repairs to gate valve, stem shaft, and guides should be made immediately.

Little Youghiogheny Site No. 1 is classified as a "small" size, "high" hazard dam based on guideline criteria. Soil Conservation Service design calculations indicate that the discharge capacity of the emergency spillway is adequate to pass 100% of PMF without the dam being overtopped. Under these conditions, however, significant erosion of the emergency spillway is believed likely. The emergency spillway is considered adequate to pass runoff resulting from 63% PMF rainfall without significant erosion occurring. A 1/2 PMF to PMF design storm is recommended for this dam facility. The dam and spillways are therefore considered adequate and in accordance with recommended guidelines.

The following recommendations should be implemented as soon as possible:

- 1) Replace gate valve stem shaft. Repair and maintain lifting mechanisms as necessary.
- 2) Develop a formal flood surveillance and warning plan.
- 3) Remove debris from low stage trash rack and orifice opening.
- 4) Remove woody vegetation from embankment slopes and emergency spillway channels.

- (c) Observation of outlet pipe (end section) concrete surfaces for the development of significant cracking and spalling. Remedial repairs should be made as necessary.
- 5) Remove grass obstructing low stage orifice opening.
- 6) Repair eroded rills and footpaths, and backfill animal burrow holes located on embankment slopes.



James D. Hainley
 James D. Hainley, P.E. Date
 Maryland Registration No. 5284
 Vice President

Timothy E. Debes 4/24/17
 Timothy E. Debes Date
 Project Engineer

APPROVED BY: *James W. Peck* 5/1/17
 JAMES W. PECK Date
 Colonel, Corps of Engineers
 District Engineer

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LITTLE YOUGHIOGHENY SITE NO. 1



Upstream slope of dam looking west.



Downstream slope of dam looking east.

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PHASE 1 REPORT
NATIONAL DAM INSPECTION PROGRAM
LITTLE YOUGHIOGHENY WATERSHED SITE NO. 1
NATIONAL I.D. NO. MD 44

1.1 General

- a. Authority. The study was performed pursuant to the authority granted by the National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.
- b. Purpose. The purpose of this study is to evaluate if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Dam and Appurtenances

- 1) Embankment. Little Youghiogheny Site No. 1 was constructed as a zoned earthfill embankment. The embankment is approximately 375 ft. long, has a maximum toe to crest height of 33.5 ft., and crest width of 13 ft. Upstream and downstream slopes have inclinations of 3H:1V and 2.5H:1V, respectively. A 10 ft. wide berm is located on the upstream slope, 0.5 ft. above normal pool level (El. 2,412.5).
- 2) Seepage Control Provisions. According to as-built drawings, seepage control is provided by a cutoff trench and a filter trench drain. The cutoff trench is located at the embankment centerline. The trench drain is located approximately midway between embankment centerline and downstream toe. Seepage, intercepted by the trench drain, is discharged into a stilling basin by means of perforated corrugated metal pipes and a blanket drain.
- 3) Flood Discharge Facilities. Flood discharge facilities consist of a principal spillway intake structure with outlet pipe and a 65 ft. wide emergency spillway channel excavated into the right (west) dam abutment. The principal spillway intake structure is constructed of reinforced concrete and contains both low and high stage inlets. A 30 in. dia. reinforced concrete pipe is connected to the base of the intake structure and discharges into a stilling basin. The emergency spillway crest is located 8.7 ft. below top of dam and is activated by runoff from rainfall in excess of 100 year frequency.

- b. Location. Site No. 1 is located on Cherry Glade Run, a small southwest flowing tributary of Wilson Run and the Little Youghiogheny River. The dam is located one half mile northeast

of Oakland, Garrett County, Maryland. (Refer to Location Plan, Appendix E.)

- c. Size Classification. Based on a maximum dam height of 33.5 ft. and a maximum storage of 346 ac.-ft., the dam facility is accordingly classified in the "small" size category.
- d. Hazard Classification. Little Youghiogheny Site No. 1 is classified in the "high" hazard category. Due to its proximity to downtown Oakland, loss of life and substantial damage to property would result if the dam would fail.
- e. Ownership. The Wilson Run Public Watershed Association, Oakland, Maryland, is legally responsible for the operation of Little Youghiogheny Site No. 1. The dam was constructed by easement on property owned by several individuals.
- f. Purpose of Dam. The dam was constructed for the purpose of flood control.
- g. Design and Construction History. The dam was designed by the Soil Conservation Service, Engineering and Watershed Planning Unit, Upper Darby, PA in 1963. Construction was performed by the Phoenix Construction Company and completed on September 19, 1964.
- h. Normal Operating Procedure. The dam operates as an uncontrolled structure. The reservoir is normally maintained at El. 2,412.0 by passage of normal base flow through the low stage principal spillway orifice.

1.3 Pertinent Data

| | |
|--|--------------|
| a. <u>Drainage Area</u> | 0.63 sq. mi. |
| b. <u>Discharge at Dam Site</u> | |
| Maximum known flood at dam site | Unknown |
| Ungated spillway capacity at design high water | 1,240 cfs |
| Spillway capacity at top of dam elevation | 5,450 cfs |
| c. <u>Elevation (feet above MSL)</u> | |
| Constructed top of dam | El. 2,431.5 |
| Design high water | El. 2,426.4 |
| Normal pool | El. 2,412.0 |
| Emergency spillway crest | El. 2,422.8 |
| Principal spillway high stage | El. 2,415.5 |
| Principal spillway low stage | El. 2,412.0 |
| Maximum tailwater | Unknown |
| Upstream invert of outlet pipe | El. 2,401.0 |
| Downstream invert of outlet pipe | El. 2,399.0 |
| Downstream toe | El. 2,398.0± |

d. Reservoir Length

| | |
|------------------------|------------------|
| Length of maximum pool | Approx. 0.80 mi. |
| Length of normal pool | Approx. 0.34 mi. |

e. Total Storage

| | |
|-------------------------------|---------------|
| Constructed top of dam | 346.0 ac.-ft. |
| Design high water | 213.0 ac.-ft. |
| Emergency spillway crest | 138.5 ac.-ft. |
| Principal spillway high stage | 46.0 ac.-ft. |
| Principal spillway low stage | 23.0 ac.-ft. |
| Normal pool level | 23.0 ac.-ft. |
| Sediment pool | 23.0 ac.-ft. |

f. Reservoir Surface

| | |
|--------------------------|------------|
| Constructed top of dam | 34.0 acres |
| Design high water | 22.4 acres |
| Emergency spillway crest | 17.8 acres |
| Normal pool | 5.0 acres |
| Sediment pool | 5.0 acres |

g. Dam

| | |
|------------------------------------|-------------------------|
| Type | Zoned earthfill |
| Length | 375.0 ft. |
| Height | 33.5 ft. |
| Top width | 13.0 ft. |
| Side slopes | |
| Downstream - | 2.5H:1V |
| Upstream (with 10 ft. wide berm) - | 3.0H:1V |
| Zoning | yes |
| Impervious core | yes |
| Cutoff provisions | Compacted cutoff trench |
| Grout curtain | None |

h. Regulating Outlet

| | |
|----------------------------------|---|
| Type | Concrete intake structure and 30 in. dia. R.C. outlet pipe |
| Riser height | 17.2 ft. |
| Riser dimensions | |
| Inside - | 2.5x7.5 ft. |
| Outside - | 4.5x9.5 ft. |
| Length of connecting outlet pipe | Approx. 168.33 ft. |
| Gates | 8 in. dia. gate valve (reservoir drain) |

i. Emergency Spillway

| | |
|-----------------|-------------|
| Type | Earth |
| Width | 65.0 ft. |
| Crest elevation | El. 2,422.8 |

i. Emergency Spillway (cont.)

| | |
|--------------------|--|
| Gate | None |
| Upstream channel | Vegetated earth with negative 1.0% slope |
| Downstream channel | Vegetated earth with positive 2.1% slope |
| Length of channel | 380.0 ft., curved |

SECTION 2 DESIGN DATA

2.1 Design

a. Data Available

- 1) Hydrology and Hydraulics. Design calculations, stage-storage and discharge rating curves, hydrographs, and flood routing calculations were obtained from Design Report, Little Youghiogheny Site No. 1, April 1963, prepared by the Soil Conservation Service.
- 2) Embankment. Test boring and test pit logs, geology report, soil test results, and design calculations were obtained from the design report identified above. As-built drawings obtained with the design report show embankment plans and cross sections. The Soil Conservation Service publication entitled Construction and Material Specifications for Little Youghiogheny River Watershed, Flood Detention Structure No. 1 was also available.
- 3) Appurtenant Structures. The documents identified in Section 2.1-a(2) include design drawings, design calculations, and construction specifications for the principal and emergency spillways.

b. Design Features. The dam and appurtenances were designed in accordance with Soil Conservation Service "high" hazard (class C) and Maryland State criteria. Illustrations of principal design features are shown in Plate Nos. 1 through 6. A description of design features is also discussed in Section 1.2, "Description of Project".

- 1) Embankment. Design documents indicate that the dam was constructed as a zoned earthfill embankment with soils obtained from on-site borrow areas. The embankment core is constructed of compacted clayey and silty sand (SC and SM). Compacted clayey gravel and clayey sands (GC and SC) were used in the embankment shell sections. All embankment soils were compacted to a minimum of 95% of Standard Proctor density. Foundation preparation involved clearing, grubbing, and removal of top soil and unsuitable material. An old embankment was also removed from the site (see Plate No. 2). The dam embankment overlies a layer of sandy clay (CL), silty sand (SM), and clayey silt (ML) with some gravel present. This layer ranges in depth from about 2 to 5 ft. in the valley floor area to a maximum of 10 ft. near the toe of the left (east) abutment. The underlying bedrock consists of alternating layers of sandstone, siltstone, and silty shales. Most core samples (see Plate No. 3) indicate that bedrock is weathered and jointed.

- 2) Seepage Control Provisions. The earthfill cutoff trench located at the embankment centerline was excavated to bedrock in valley floor and abutment slopes. The trench has a bottom width of 14 ft., 1H:1V side slopes, and is backfilled with compacted sandy clay. Some seepage through the embankment foundation was expected because of weathered and jointed bedrock.

The filter trench drain was constructed to intercept seepage through both embankment and foundation (see Plate No. 4). The trench was excavated approximately 1 or 2 ft. into bedrock in the valley floor area and in abutment slopes to El. 2,417.0 (5 ft. above normal pool). The trench measures 4 ft. wide, 6 to 8 ft. deep, and is filled with graded sand and gravel. Perforated corrugated metal pipe, 6 in. in diameter, was placed in the trench drain section right (west) of the principal spillway outlet pipe. Outlet blanket drains, containing filter material and perforated and non-perforated corrugated metal pipe, divert seepage collected by the trench drains into the stilling basin.

- 3) Flood Discharge Facilities. Flood discharge facilities consist of a principal spillway intake structure with pond drain, outlet pipe, and emergency spillway channel. Details of each spillway are shown in Plate Nos. 3, 5, and 6.

The principal spillway intake structure is constructed of reinforced concrete and contains low and high stage inlets. One (1) low stage orifice, measuring 1.0 ft. high and 2.5 ft. wide, is located at normal pool level (El. 2,412.0) and is protected by a steel trash rack cage. Two (2) high stage riser crest openings are located 3.5 ft. above normal pool level (El. 2,415.5). These openings measure 1.0 ft. high by 7.5 ft. wide.

The top of the intake structure is constructed with a reinforced concrete slab for anti-vortex protection. Steel crosspieces serve as trash racks for the riser crest openings. The intake structure also contains an 8 in. dia. reservoir drain gate valve. An 8 in. dia. cast iron pipe connects the reservoir drain inlet to the gate valve. The inlet consists of a 24 in. dia. perforated corrugated metal pipe installed vertically on the floor of the reservoir.

A 30 in. dia. reinforced concrete outlet pipe, with four (4) anti-seep collars, is connected to the base of the intake structure and discharges into the stilling basin. The last outlet pipe section (at stilling basin) is supported by a reinforced concrete cradle and stainless steel strap (see Plate No. 6). A continuous non-reinforced concrete cradle supports the other pipe sections.

The emergency spillway channel was excavated into silty sand and weathered sandstone at the right (west) dam abutment. The weathered sandstone underlying the channel was penetrated to a depth of 12 ft. below final grade by auger boring (see Plate No. 3). The channel is trapezoidal in shape, with a bottom width of 65 ft. and 2H:1V side slopes. Channel cover consists of top soil vegetated with grass. The channel control section is located 8.7 ft. below top of dam (El. 2,422.8).

2.2 Construction. The available design documents and field observations indicate that the dam was constructed in general accordance with the intended design drawings and specifications. During construction a 4 in. dia. tile drain was installed in the valley floor downstream of the dam to intercept flow from springs and divert it to the outlet channel (see Plate No. 2). The riprap gutter shown on Plate No. 2 was omitted during construction because of final grade topography. No unusual construction difficulties were reported.

2.3 Operation. The Wilson Run Public Watershed Association is responsible for the operation of Little Youghiogheny Site No. 1. The discharge of principal and emergency spillways is uncontrolled. The only operational feature is the reservoir drain gate valve which is normally closed. This valve was found inoperable at the time of the field reconnaissance.

2.4 Evaluation

- a. Availability. All available design information and drawings were provided by the Dam Safety Division, Maryland Water Resources Administration and the Soil Conservation Service.
- b. Adequacy. The design data provided is reasonably documented and is considered adequate to evaluate the dam and appurtenant structures in accordance with the scope of a Phase 1 study. Based on a review of this data, the dam and appurtenant structures are considered to have been designed in general conformance with accepted engineering practice.
- c. Validity. At this time, there is no observable evidence or reason to question the validity of the available design information and drawings.

SECTION 3 VISUAL INSPECTION

3.1 Findings

a. General. The on-site reconnaissance of Little Youghiogheny Site No. 1 consisted of:

- 1) Visual observation of the earth embankment, abutments, and emergency spillway.
- 2) Visual observation of exposed sections of the principal spillway intake structure, gate valve mechanisms, outlet pipes, and plunge pool.
- 3) Visual observation of discernible hazardous conditions or safety deficiencies.
- 4) Evaluation of the downstream hazard potential.

A visual observation checklist and field sketch are given in Appendix A. Specific observations are illustrated in photographs of Appendix D.

In general, visual observations indicate the dam embankment and spillway are in good condition. Visual observations were made during periods when reservoir and tailwater were at normal pool levels.

The following conditions were observed on the dates of the field reconnaissances.

b. Embankment

- 1) Surficial. Embankment slopes and abutment junctions are predominately vegetated with a dense grass. However, some woody vegetation is growing in the area of the left (east) downstream abutment junction. A groundhog hole is also located in this area. Rill erosion is evident along the entire 80 ft. length of the right (west) downstream abutment junction. A worn and eroded footpath, about 0.4 ft. deep, extends across the dam crest and left abutment. The upstream slope berm is slightly scoured around the downstream side of the principal spillway riser.
- 2) Wet Zone. A wet zone is located about 30 ft. from the toe of the downstream embankment slope and about 80 ft. to the right (west) of the outlet plunge pool. This zone is thoroughly saturated and soft. However, no seepage was observed emanating from the dam embankment or foundation.

c. Appurtenant Structures

- 1) Emergency Spillway. Emergency spillway channel bottom and side slopes are vegetated and have adequate erosion protection. Some woody vegetation covers the mid-sections of the spillway channel. This woody growth extends about 200 ft. along the length of the upstream and downstream channel sections. (See Photographs 3 and 4.)
- 2) Principal Spillway Riser. There was no observable evidence of cracking or spalling on exposed concrete surfaces. Wood and flow debris are partially obstructing the low stage trash rack and orifice opening. The gate valve stem shaft is broken and hence the 8 in. gate valve can not be operated. The gate valve is in a closed position.
- 3) Outlet Works. No significant deficiencies were observed.

- d. Reservoir Area. Visual observations and a map review indicate the immediate reservoir drainage area has gentle to moderate slopes. Reservoir shoreline and slopes are predominately covered with woodland and open pasture, and appear stable.

Reservoir water is heavily laden with silt and sediment. An investigation of the upstream reservoir area indicates fly ash and soil stockpiles are located beside Cherry Glade Run. It is suspected that surface drainage from the stockpiles carry fly ash and sediment into the stream channel. Construction of new homes in the vicinity of the reservoir pool is also believed to contribute to the transporting of sediment into the reservoir.

- e. Downstream Channel. The plunge pool drains into Cherry Glade Run which joins Wilson Run approximately 450 ft. downstream of the dam embankment. The downstream channel is about 5 ft. in width, has stable side slopes and was observed free of debris, vegetation, and other flow obstructions.

A 4 in. dia. steel drain pipe exits on the right (west) side of the exit channel, approximately 180 ft. downstream of the dam. This pipe serves as an outlet for a tile drain collector system installed to drain springs.

Cherry Glade Run underpasses Old Deer Park Road via a 48 in. dia. concrete pipe. Old Deer Park Road is located approximately 250 ft. downstream of the dam.

3.2 Evaluation

- a. Embankment. The rill erosion, eroded footpaths, groundhog hole, and scour on the upstream slope berm are surficial deficiencies and are not considered significant. However, remedial repairs should be made as soon as practical.

The wet zone located at the toe of the dam embankment is situated in an active spring area. A tile collector system is installed in this area to drain spring flow. Based on this information, an embankment or foundation seepage condition is not considered associated with the wet zone. Therefore, the wet zone is not considered to present hazard to the dam.

In general, the dam embankment is considered to be in good condition.

b. Appurtenant Structures

- 1) Principal Spillway Riser. The reservoir drain gate valve is inoperable and is judged inadequate in its present condition. The broken stem shaft should be replaced as soon as possible. Wood and flow debris should be removed from the low stage trash rack and orifice opening.
- 2) Emergency Spillway. Woody vegetation covering the mid-sections of the upstream and downstream channels should be removed. In general, spillway channels are in good condition.

SECTION 4 OPERATIONAL FEATURES

- 4.1 Procedure. Under normal conditions, the reservoir level is maintained at El. 2,412.0 by the low stage orifice of the principal spillway riser. Both principal and emergency spillways are ungated and do not require a dam tender. The only operational feature of the dam is a mechanical gate valve used to lower or drain the reservoir pool. The gate valve is infrequently operated and is normally closed.
- 4.2 Maintenance of Dam. The dam facility is maintained by the Wilson Run Public Watershed Association. According to local Soil Conservation Service officials, maintenance usually consists of cutting grass, removing brush from embankment slopes, seeding, liming, and fertilizing slopes, removing trash from dam premises, and clearing debris from the trash racks. Maintenance is reportedly performed on an annual basis.
- 4.3 Inspection of Dam. Operation and maintenance inspections are usually performed by the Soil Conservation Service, on an annual basis. These inspections are performed at the request of the Wilson Run Public Watershed Association. Inspections generally consist of visually examining the dam embankment, appurtenant structures, reservoir area, and outlet channel, and providing repair recommendations.
- 4.4 Maintenance of Operating Facilities. There is no record of how often the gate valve operating mechanisms are maintained and exercised. However, at the time of the field reconnaissance, the gate valve was inoperable.
- 4.5 Warning Systems in Effect. There is no warning system or formal emergency procedure to alert or evacuate, as necessary, downstream residents in the event or threat of a dam failure.
- 4.6 Evaluation. In general, maintenance procedures at Little Youghiogheny Site No. 1 are considered marginal. Inspection and necessary repair of the reservoir drain gate valve should be performed at least once each year. A formal flood surveillance and warning plan is needed for the protection of downstream residents.

SECTION 5 HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features

- a. Design Data. Little Youghiogheny Site No. 1 was designed for the purpose of flood control. The watershed has an area of 403 acres and ranges in relief from El. 2,412.0 to 2,600.0. Watershed cover consists predominately of pasture and cultivated land. A weighted curve number (CN) of 76 for antecedent moisture condition II, was used to define the watershed cover complex. Little Youghiogheny Site No. 2 is located on Cherry Glade Run 1 mile upstream of Site No. 1. The maximum storage capacity of Site No. 2 is 222 ac.-ft.

The hydrologic/hydraulic analyses contained in the design report were reviewed and found in accordance with accepted engineering practice.

Dam height and discharge capacity of principal and emergency spillways were based on Soil Conservation Service "high" hazard (class C) and Maryland State design storm criteria. Estimated fifty year sediment accumulation of 23 ac.-ft. was used to set normal pool level (El. 2,412.0). This level is controlled by passage of normal base flow through the low stage principal spillway orifice.

The emergency spillway crest elevation was set at the maximum reservoir level resulting from a 100 year frequency, 24 hr. duration design storm. Rainfall of 5.9 in./24 hr., antecedent moisture condition III, and outflow from Site No. 2 were used to analyze this condition. The emergency spillway crest was accordingly set at El. 2,422.8 (8.7 ft. below top of dam).

Design high water conditions were based on a rainfall amount of 13.5 in./6 hr. This design storm was used for design of the emergency spillway channel. The inflow hydrograph for Site No. 1 was based on outflow from Site No. 2 and runoff from the Site No. 1 subwatershed. Calculations indicate a peak reservoir elevation of 2,426.4 ft. (5.1 ft. below top of dam) and maximum channel flow velocity of 8.0 fps for this design storm.

The elevation of top of dam was set at the maximum reservoir level resulting from design rainfall of 27 in./6 hr. (22.2 in. runoff). Outflow from Site No. 2 was included in the analysis. Flood routing calculations indicate peak outflow of 5,450 cfs and maximum reservoir elevation of 2,431.5 ft. for this rainfall amount. This reservoir level exceeded the elevation for top of dam specified by Maryland State requirements. Top of dam was thus set at El. 2,431.5.

- b. Experience Data. No records of reservoir levels or rainfall amounts are kept. The storm of record for this area occurred in March 1936. Design calculations indicate that runoff from this storm (6.1 in./48 hr.) would result in a maximum reservoir level 8.4 ft. below top of dam. There is no record of the emergency spillway ever being activated during periods of heavy rainfall.
- c. Visual Observations. No serious appurtenant structure deficiencies were noted during the visual inspections. The inoperable reservoir drain does not reduce the discharge capacity of the principal spillway.
- d. Overtopping Potential. Based on Corps of Engineers' guidelines, the recommended design storm for "small" size, "high" hazard dams is given as $\frac{1}{2}$ PMF to PMF (Probable Maximum Flood). According to Hydrometeorological Report No. 33, the rainfall amounts for these design storms are given as 10.7 in./6 hr. and 21.4 in./ 6 hr., respectively (see Appendix C). Top of dam elevation was based on design rainfall of 27 in./6 hr. The dam can therefore accommodate 100% PMF runoff without being overtopped.
- e. Emergency Spillway Adequacy. Design calculations indicate that the emergency spillway will have maximum discharge values of 1,127 cfs for design high water conditions (13.5 in./6 hr. rainfall) and 5,327 cfs at top of dam (27.0 in./6 hr. rainfall). These discharge values yield channel flow velocities of 8.0 fps and 15.6 fps, respectively. Flow velocities are based on a normal flow condition in the downstream section of the spillway channel.

Maximum permissible flow velocities, recommended by Soil Conservation Service TR 60, are typically in the range of 4 to 7 fps for vegetated spillways. The maximum flow velocity (8.0 fps) for design high water conditions (63% of PMF rainfall) slightly exceeds this permissible range. Design calculations indicate that the emergency spillway will be activated for a duration of 8.6 hrs. for design high water conditions. Because the maximum flow velocity would occur for a much shorter duration, the emergency spillway is considered adequate to pass runoff resulting from 63% PMF rainfall (13.5 in./6 hr.). However, erosion of the spillway vegetative cover and underlying severely weathered sandstone would be expected from 100% PMF runoff.

- f. Downstream Conditions. Approximately 250 ft. downstream of Little Youghiogheny Site No. 1, Cherry Glade Run underpasses Old Deer Park Road via a 48 in. dia. pipe culvert. Cherry Glade Run joins Wilson Run about 450 ft. downstream of the dam. Wilson Run traverses the south and west central downtown sections of Oakland before merging with the Little Youghiogheny River. The estimated Wilson Run floodplain includes at least sixteen (16) commercial and residential structures.

SECTION 6 STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

- 1) Embankment. Surficial deficiencies identified in Section 3.1-b(1) are not considered to have a significant effect on dam stability. The wet zone located at the toe of the dam is attributed to spring activity and is not considered to present a significant hazard to the dam. In general, visual observations indicate the structural performance of the embankment is good under normal pool conditions.
- 2) Appurtenant Structures. Visual observations of the principal and emergency spillways and outlet works did not reveal evidence of structural distress that would significantly affect hydraulic performance or dam stability.

b. Design and Construction Data

- 1) Subsurface Exploration. The geological and subsurface investigation of the dam site and borrow areas included 19 test pits and 8 power auger drill holes. (See Plate Nos. 1, 2, and 3.)

Test boring logs indicate abutment overburden soils predominately consist of residual silty sands (SM) and clayey silts (ML). These residual soils average 3 ft. in depth. Soft weathered shale and siltstone overlie the predominate weathered sandstone abutment bedrock. Valley floor soils consist of soft silt and clay alluvium, underlain by sandy clay, silty sand, and clayey silt with some gravel present.

Foundation bedrock at dam centerline reportedly consists of alternating fine grained sandstones, siltstones, and silty shales.

- 2) Laboratory Testing. Classification, compacted dry density, consolidation, permeability, and shear strength tests were performed on selected foundation and borrow soils. The soil samples were obtained from split spoon and Shelby tube samplers, and test pit excavations.

A consolidation test performed on a foundation soil sample indicated an expected settlement of about 0.3 ft. for the embankment loading. A direct shear strength of $\phi = 30.5^\circ$ and $c = 100$ psf was reportedly obtained for this soil.

Permeability rates for foundation soils averaged 0.0146 ft/day. Permeability of foundation bedrock was expected to vary depending on the degree of weathering and jointing.

Embankment triaxial specimens were compacted to 95% of Standard Proctor density. The following saturated consolidated undrained shear strengths were obtained:
 $\phi = 16.5^\circ$, $c = 475$ psf (CL), $\phi = 20^\circ$, $c = 700$ psf (GC),
and $\phi = 32.5^\circ$, $c = 675$ psf (GM).

- 3) Slope Stability Analysis. Slope stability of upstream and downstream embankment slopes was evaluated using the Swedish Circular Arc Method. The analysis considered a 31 ft. high (at centerline) homogeneous structure with a 3H:1V upstream slope (with 10 ft. berm) and a 2.5H:1V downstream slope (with 10 ft. berm). The lowest factor of safety against shear failure was reported to be 1.6 for the rapid drawdown condition of the upstream slope, and 1.46 for the steady-state seepage condition of the downstream slope. The steady-state phreatic surface used in this analysis sloped from the emergency spillway crest level (7 ft. below dam crest) to 8.5 ft. above the embankment toe (22.5 ft. below dam crest).
- 4) Seepage Analysis. No calculations or references were found in the design report to indicate seepage analyses were performed.
- c. Operating Records. Operating records are not maintained at the dam facility. However, the structural stability of the dam embankment and appurtenant structures is not considered to be affected by the operation of the gate valve.
- d. Post-Construction Changes. There are no reports of post-construction changes made at this dam facility.
- e. Seismic Stability. Little Youghiogeny Site No. 1 is located in a Seismic Zone 1 area (low seismic probability). Earthquake loadings were not considered in the stability analysis presented in the design report.

Based on visual observations, static stability factors of safety, and guideline criteria for the evaluation of seismic stability of dams, the dam embankment is presumed to be adequate under these earthquake conditions.

SECTION 7
ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

a. Evaluation

- 1) Embankment. The visual observations indicate Little Youghiogheny Site No. 1 is in good condition. At normal pool level, there was no discernible evidence of conditions that would significantly affect the overall performance of the dam embankment. However, embankment improvements will be required to repair rill, footpath and scour erosion, backfill animal burrows, and remove woody vegetation.
 - 2) Wet Zone. The wet zone located downstream of the embankment toe is not considered to represent significant hazard to embankment stability. This wet zone is not believed to be the result of seepage emanating from the dam embankment or foundation.
 - 3) Reservoir Siltation. Siltation of the reservoir is believed to be partially attributable to surface drainage transporting fly ash and soil stockpiled near Cherry Glade Run. This excessive siltation will reduce the design life of the reservoir.
 - 4) Gate Valve. The reservoir drain gate valve, housed in the principal spillway riser, is inoperable and is judged inadequate in its present condition. The ability to drain the reservoir and perform remedial work on submerged portions of embankment and riser requires that the drain be operational.
 - 5) Principal and Emergency Spillways. Visual observations and review of design documents indicate that the principal and emergency spillways are stable and in good condition. Removal of woody vegetation from emergency spillway channels is advised.
 - 6) Flood Discharge Capacity. Design calculations indicate that the discharge capacity of the spillways is adequate to pass 100% of PMF (21.4 in./6 hr. rainfall) runoff without the dam being overtopped. Under these conditions, however, erosion of the emergency spillway channel is expected to occur. The emergency spillway is considered adequate to pass runoff resulting from 63% PMF rainfall (13.5 in./6 hr.) without significant erosion occurring. A $\frac{1}{2}$ PMF to PMF design storm is recommended for this dam facility. The dam and spillways are therefore considered adequate and in accordance with recommended guidelines.
- b. Adequacy of Information. The design information and drawings available for this review were of sufficient detail to adequately conduct a Phase 1 study.

- c. Necessity for Further Investigation. The condition of Little Youghiogheny Site No. 1, as it presently exists, does not require additional investigation.
- d. Urgency. The recommendations/remedial measures presented in this report should be implemented as soon as possible.

7.2 Recommendations/Remedial Measures. The following recommendations are presented based on the data obtained.

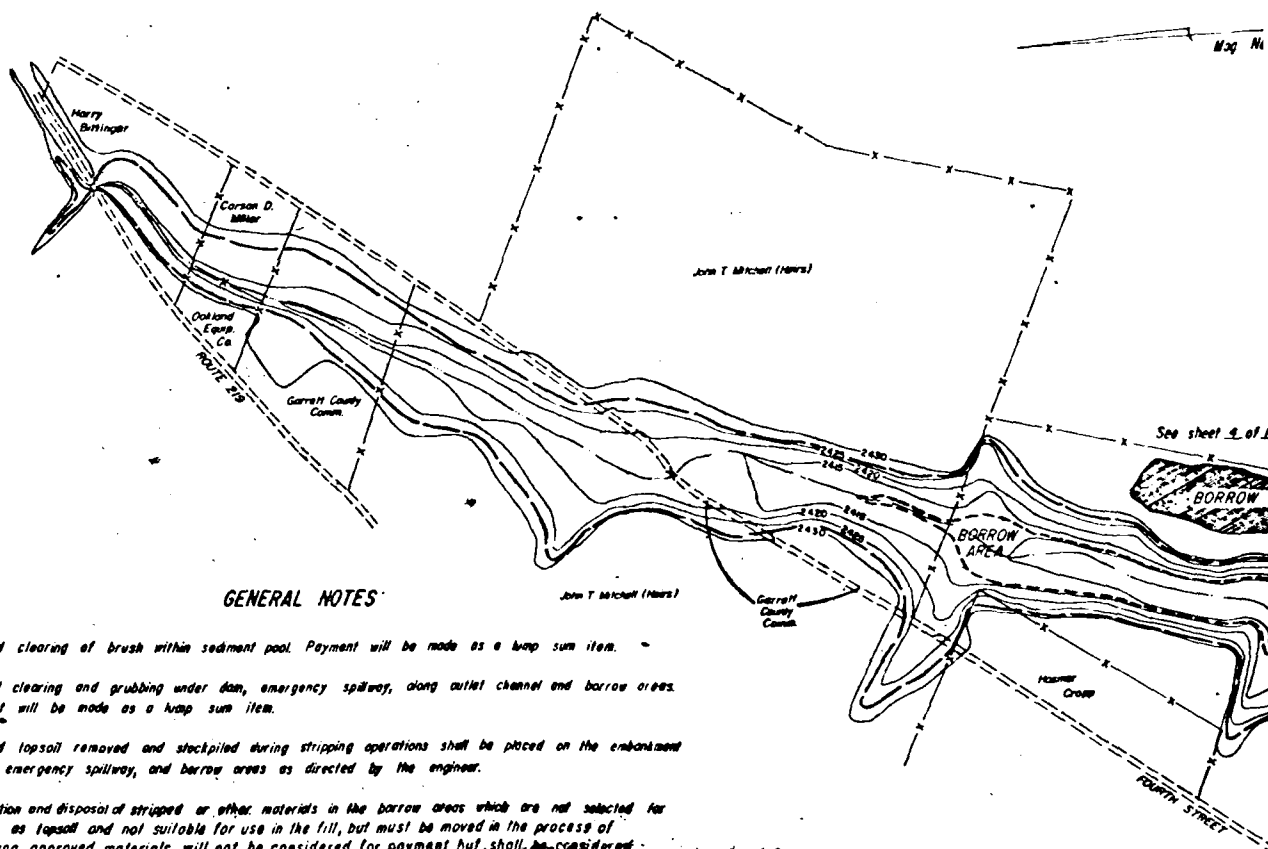
a. Dam and Appurtenant Structures

- 1) Replace gate valve stem shaft. Repair and maintain lifting mechanisms as necessary.
- 2) Remove debris from low stage trash rack and orifice opening.
- 3) Remove woody vegetation from embankment slopes and emergency spillway channels.
- 4) Repair embankment surface erosion and backfill animal burrows.

b. Operation and Maintenance Procedures

- 1) Develop a formal flood surveillance and warning plan. Plan to include, but not limited to, the following:
 - a) Surveillance. Around-the-clock surveillance of the dam embankment, reservoir and tailwater pool levels, and emergency spillway channel during periods of unusually heavy rainfall.
 - b) Warning System. Formal warning procedures to alert downstream residents in the event of expected high flood flows.
 - c) Evacuation Plans. Adequate emergency contingency plans to evacuate downstream residents in the event or threat of a dam failure.
- 2) Develop a more thorough inspection and maintenance program at the dam facility. Maintenance program should include frequent maintenance and exercising of the reservoir drain gate valve and prompt remedial treatment of deficiencies.

PLATES



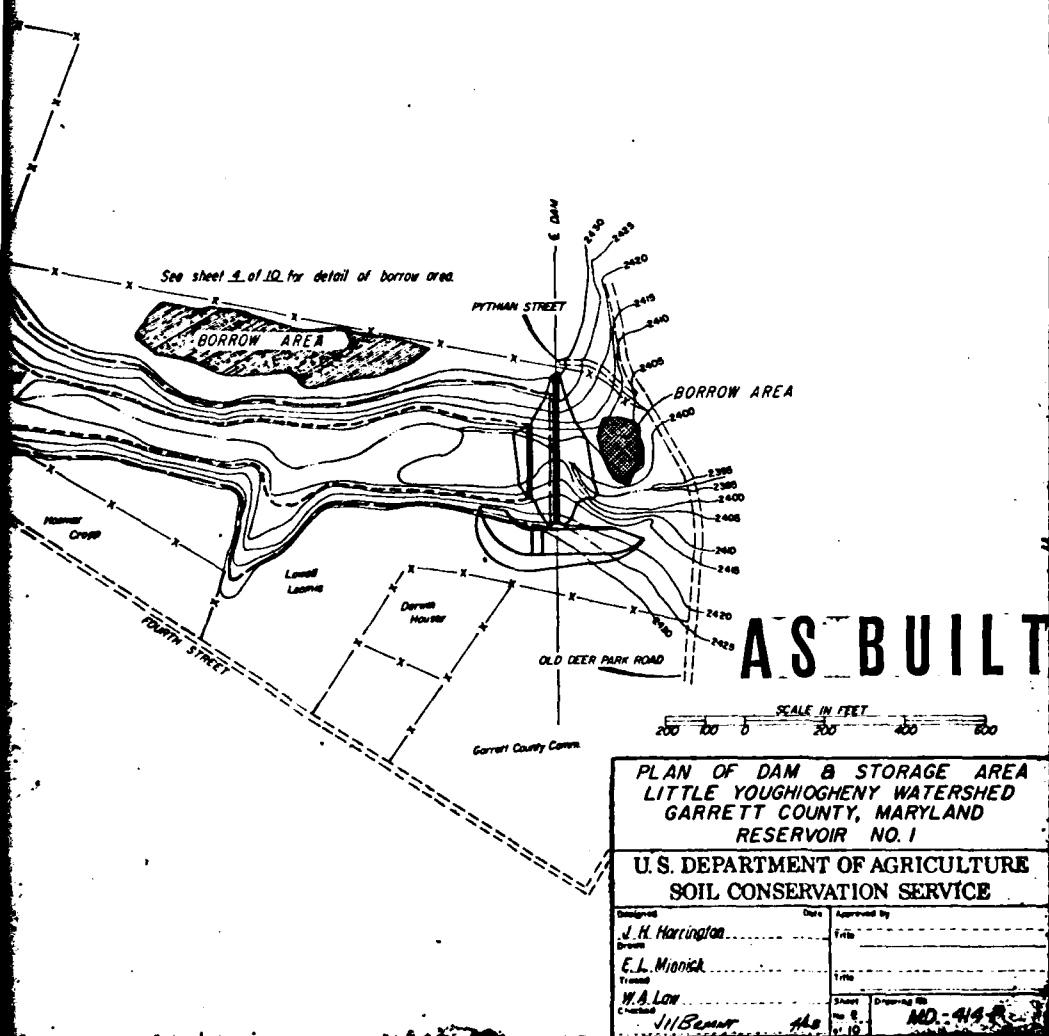
GENERAL NOTES

1. Isolated clearing of brush within sediment pool. Payment will be made as a lump sum item.
2. Isolated clearing and grubbing under dam, emergency spillway, along outlet channel and borrow areas. Payment will be made as a lump sum item.
3. Selected topsoil removed and stockpiled during stripping operations shall be placed on the embankment slopes, emergency spillway, and borrow areas as directed by the engineer.
4. Excavation and disposal of stripped or other materials in the borrow areas which are not selected for salvage as topsoil and not suitable for use in the fill, but must be moved in the process of obtaining approved materials, will not be considered for payment but shall be considered subsidiary to other items of the contract.
5. All earth fill shall be classified as class B-2 (reference paragraph 5.4.2, construction specifications). Compaction shall be performed using sheepsfoot rollers having a minimum contact pressure of 200 p.s.i.; all other type of compactive equipment will be permitted when approved in writing by the engineer.
6. Limits of borrow areas are tentative; actual limits shall be determined in the field by the engineer.
7. All property lines are approximate.

LEGEND

- Sediment Pool Elev (24120) -----
- Design High Water Elev (24264) -----
- Approximate Property Boundaries -----
- Stream -----
- Public Roads -----
- Contour Lines -----
- Borrow Area (Above Flood Pool) -----
- Borrow Area (Old Fill) -----

Mag. North



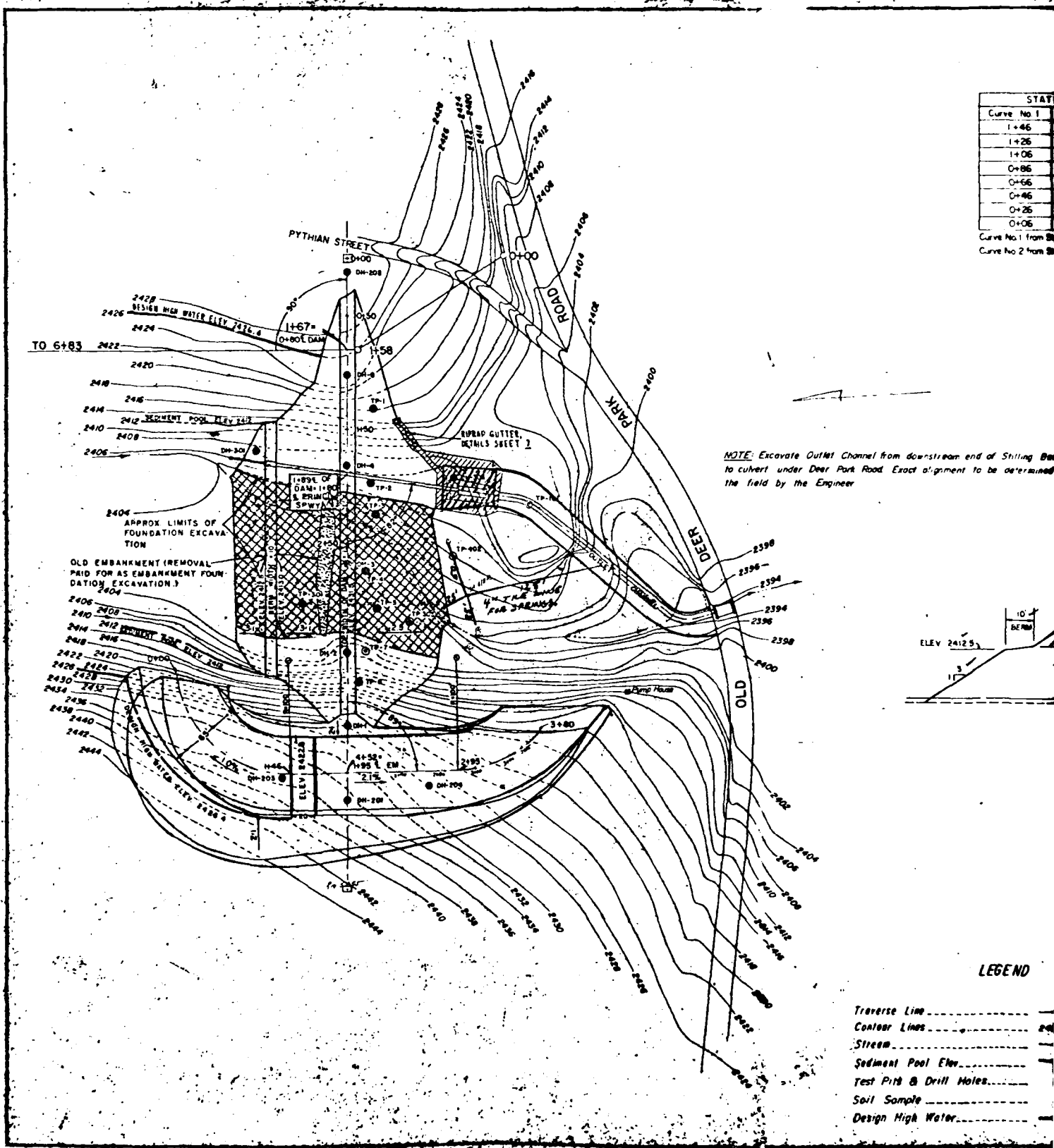
PLAN OF DAM & STORAGE AREA
LITTLE YOUGHIOGHENY WATERSHED
GARRETT COUNTY, MARYLAND
RESERVOIR NO. 1

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

| | | |
|--|---------------------------------------|------------------------------|
| Designed by J. H. Harrington | Date | Approved by |
| Drawn E. L. Mionick | | Title |
| Traced M. A. Law | | |
| Checked J. H. Bennett | Sheet No. 1 of 10 | Drawing No. MD-414 |

PLATE NO. 1

| STAT |
|---------------------|
| Curve No 1 |
| 1+46 |
| 1+26 |
| 1+06 |
| 0+86 |
| 0+66 |
| 0+46 |
| 0+26 |
| 0+06 |
| Curve No 1 from Sta |
| Curve No 2 from Sta |



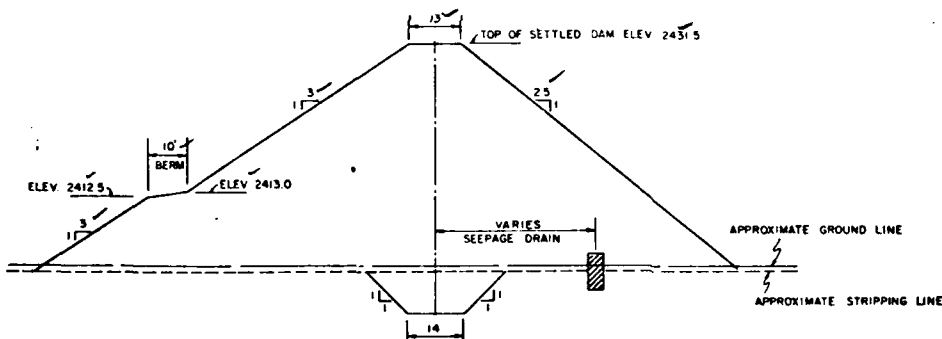
| CURVE DATA | | | |
|-------------|-------------|------------------|----------------|
| STATION | | Deflection Angle | Chord Distance |
| Curve No. 1 | Curve No. 2 | | |
| 1+46 | 2+95 | 0 | 0 |
| 1+26 | 3+15 | 5°44' | 19.98 |
| 1+06 | 3+35 | 11°28' | 39.76 |
| 0+86 | 3+55 | 17°11' | 59.09 |
| 0+66 | 3+75 | 22°55' | 77.88 |
| 0+46 | — | 28°39' | 95.89 |
| 0+26 | — | 34°23' | 112.95 |
| 0+06 | — | 40°06' | 128.82 |

Curve No. 1 from Sta. 0+00 to 1+46 (Lay out from Sta. 1+46)

Curve No. 2 from Sta. 2+95 to 3+80 (Lay out from Sta. 2+95)

NOTE: Place clayey or silty sand (SC and SM) materials represented by the logs of TP 115 and DH 201 in the center portion of the Dam.

Place clayey gravels and clayey sands (GC and SC) materials represented by the logs of TP 112 and TP 113 in outer portions of the Dam.



TYPICAL SECTION THRU DAM

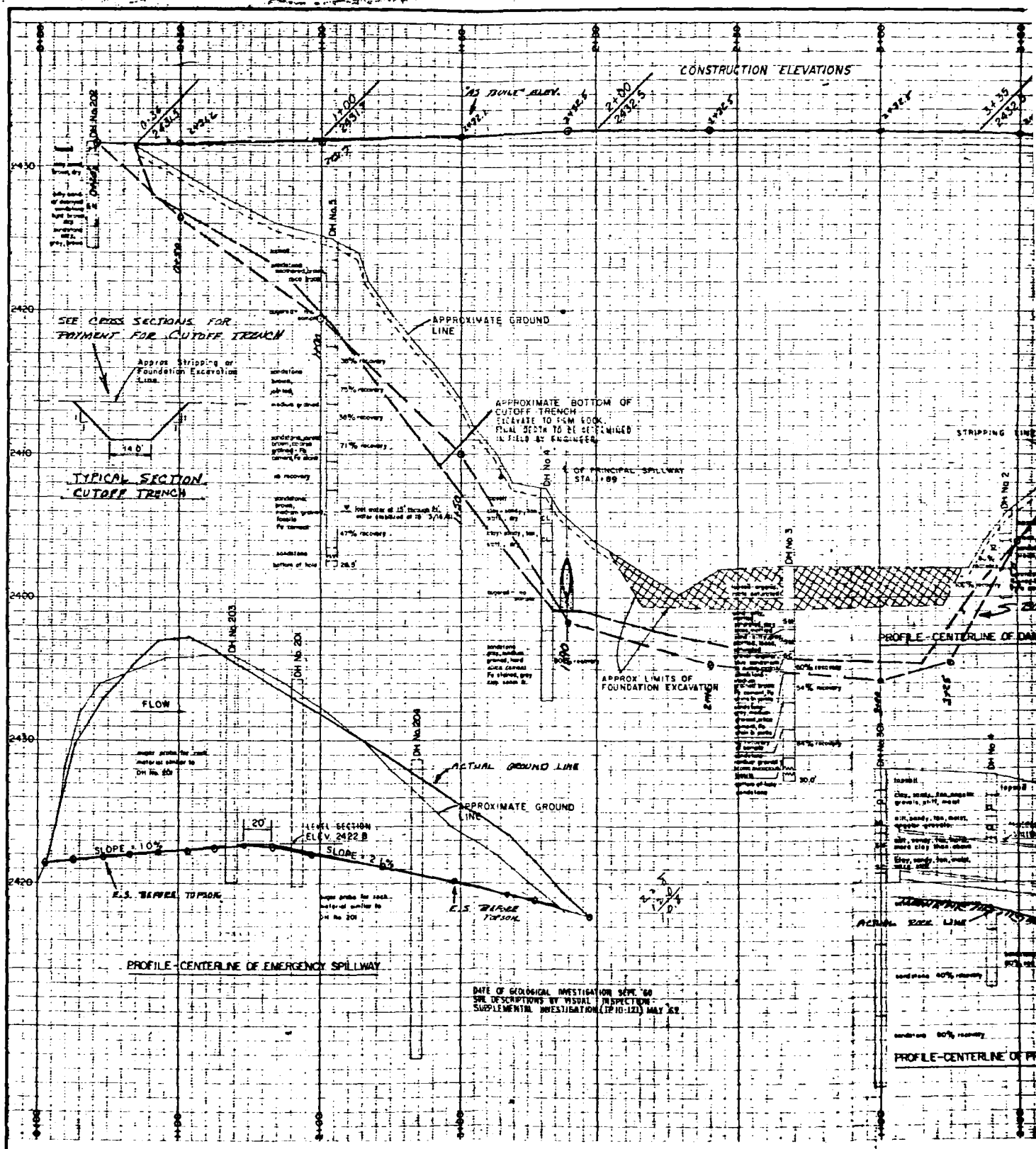
AS BUILT



LEGEND

| | |
|------------------------|------|
| Traverse Line | 1+00 |
| Contour Lines | 2+00 |
| Stream | |
| Sediment Pool Elev. | |
| Test Pit & Drill Holes | • |
| Soil Sample | • |
| Design High Water | |

| | | | |
|---|------|------------------|------------------------|
| DAM SITE-CURVE DATA LITTLE YOUGHIOGHENY WATERSHED GARRETT COUNTY, MARYLAND RESERVOIR NO. 1 | | | |
| U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | | | |
| Designed by J. H. Harrington | Date | Approved by | |
| Drawn by E. L. Mirvick | | Title | |
| Checked by J. H. Harrington | 1/12 | Sheet 3 of 10 | Drawn as No. MD-44P |



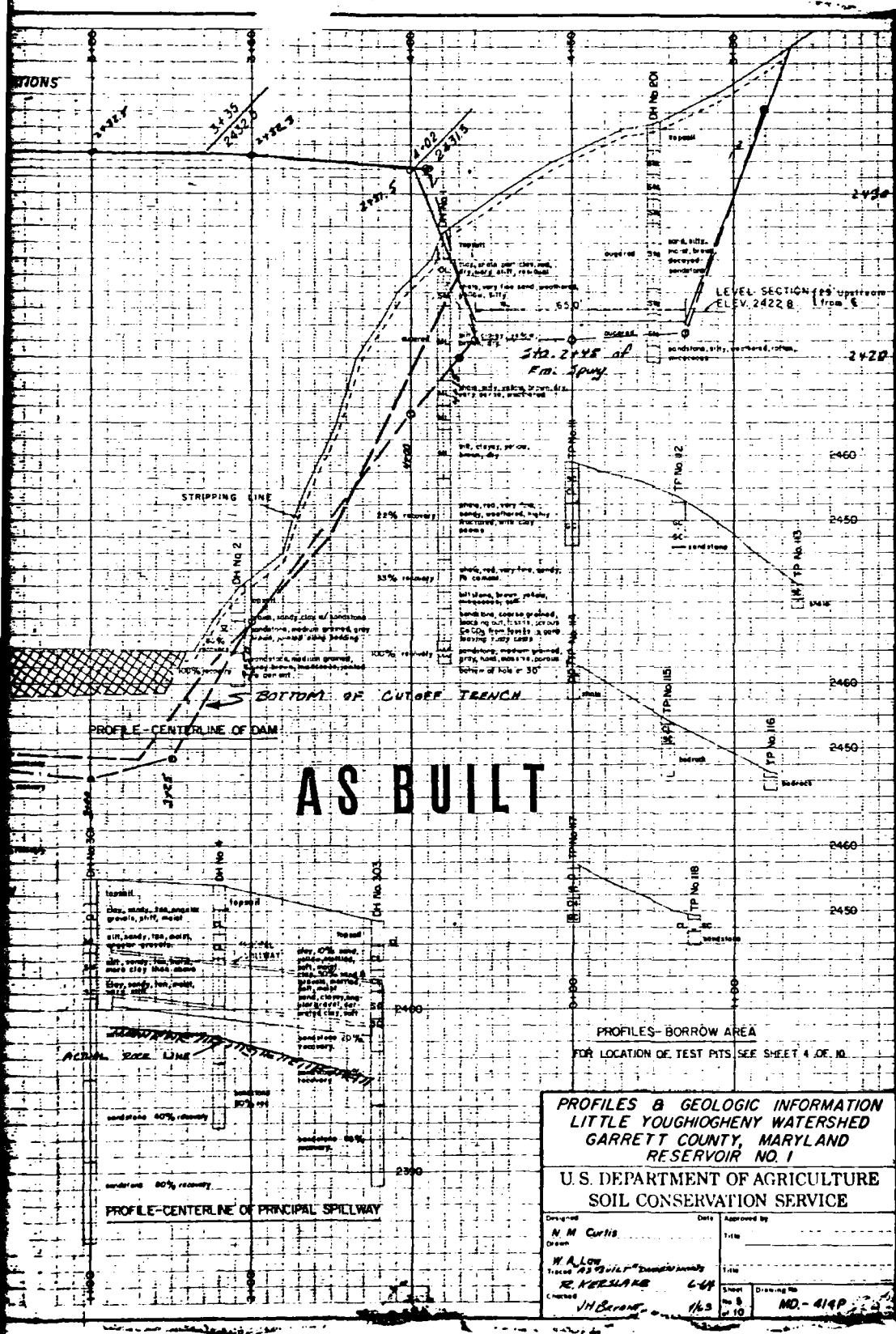


PLATE NO. 3

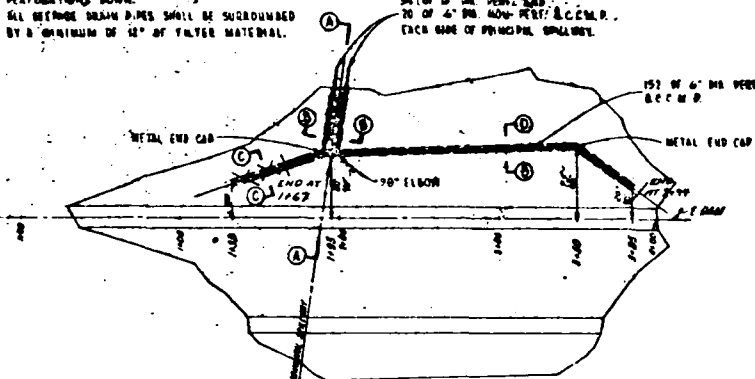
NOTES:

1. THE SEPTIC DRAIN PIPES, PERFORATED AND NON-PERFORATED, SHALL BE 6" DIA. ANNUAL, 16 GAUGE, SPIRAL 6" DIA. INSTALLED, GALVANIZED COATED CORRUGATED METAL PIPE WITH STANDARD COUPLING BANDS.

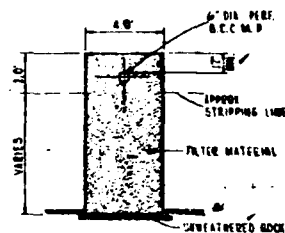
2. ALL PERFORATED PIPE SHALL BE LAID WITH THE 90° DIA. PERFORATIONS DOWN.

3. ALL SEPTIC DRAIN PIPES SHALL BE SURROUNDED BY A MINIMUM OF 12" OF FILTER MATERIAL.

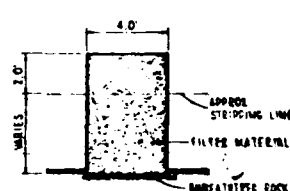
OUTLET PIPES - 3" OF 6" DIA. PERFORATED, 16 GA. GALV. COATED CORRUGATED METAL PIPE, EACH SIDE OF PRINCIPAL SPILLWAY.



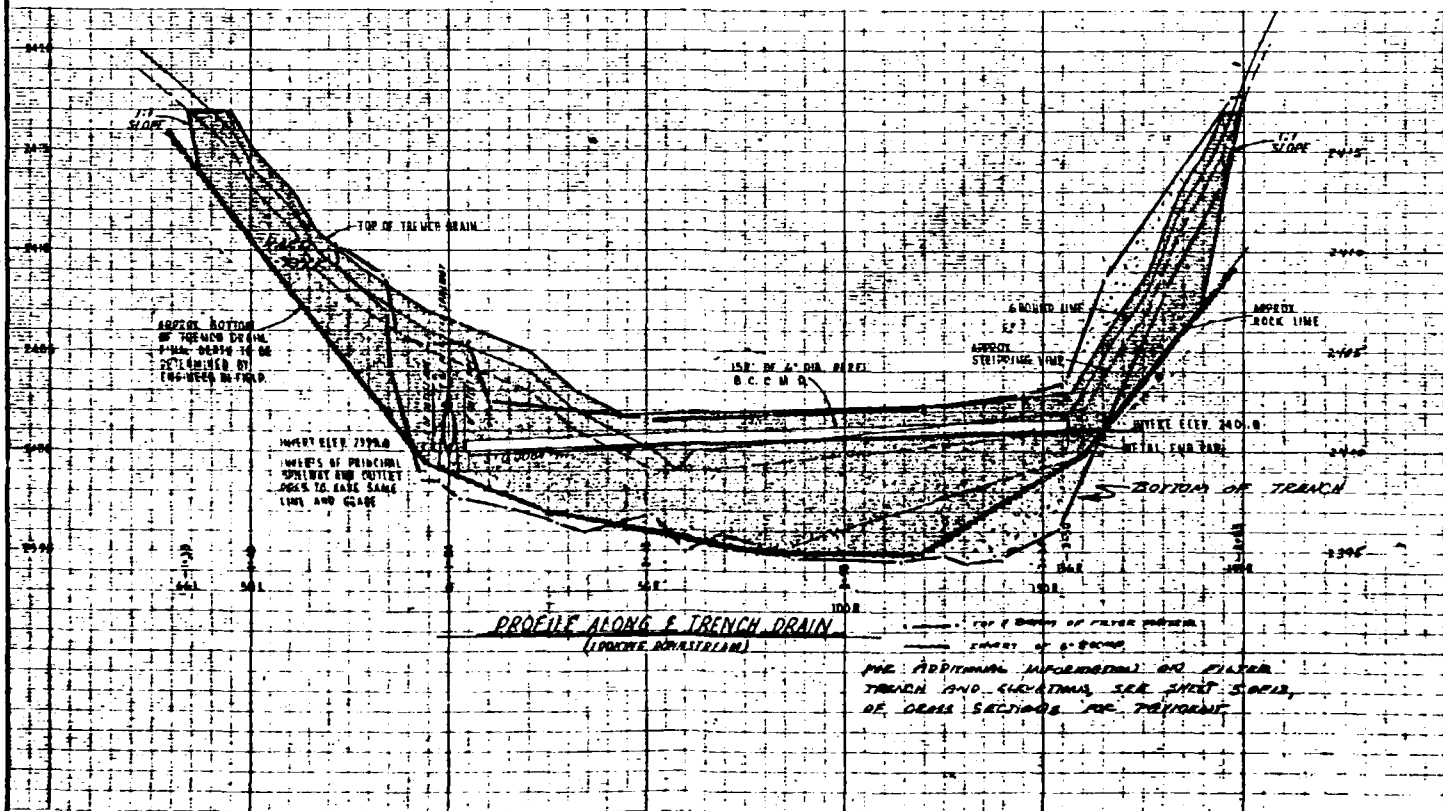
PLAN VIEW



SECTION D-D

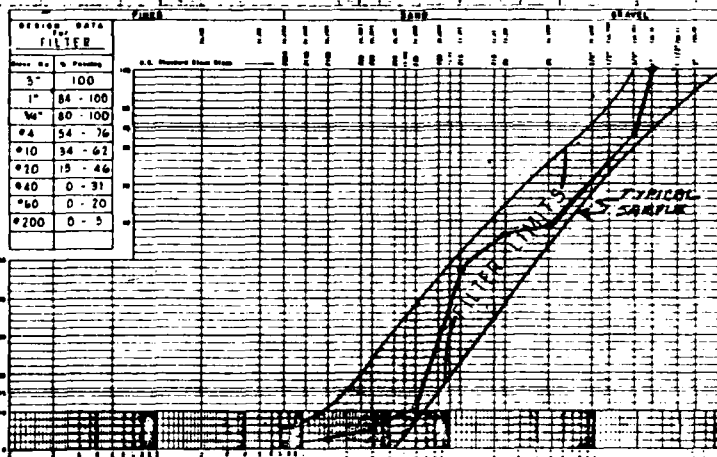
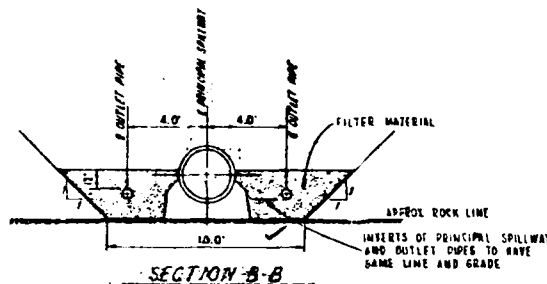
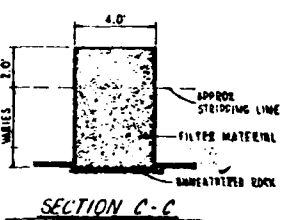
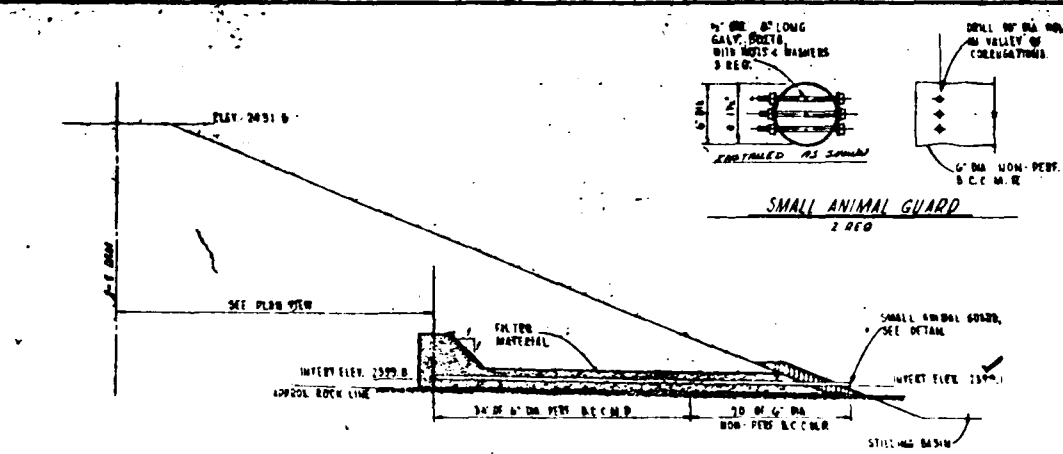


SECTION C-C



PROFILE ALONG E TRENCH DRAIN
(LOOKING DOWNSTREAM)

FOR ADDITIONAL INFORMATION ON FILTER TRENCH AND CLOSING, SEE SHEET 5001, RE. DRAIN SECTIONS FOR TRENCH.

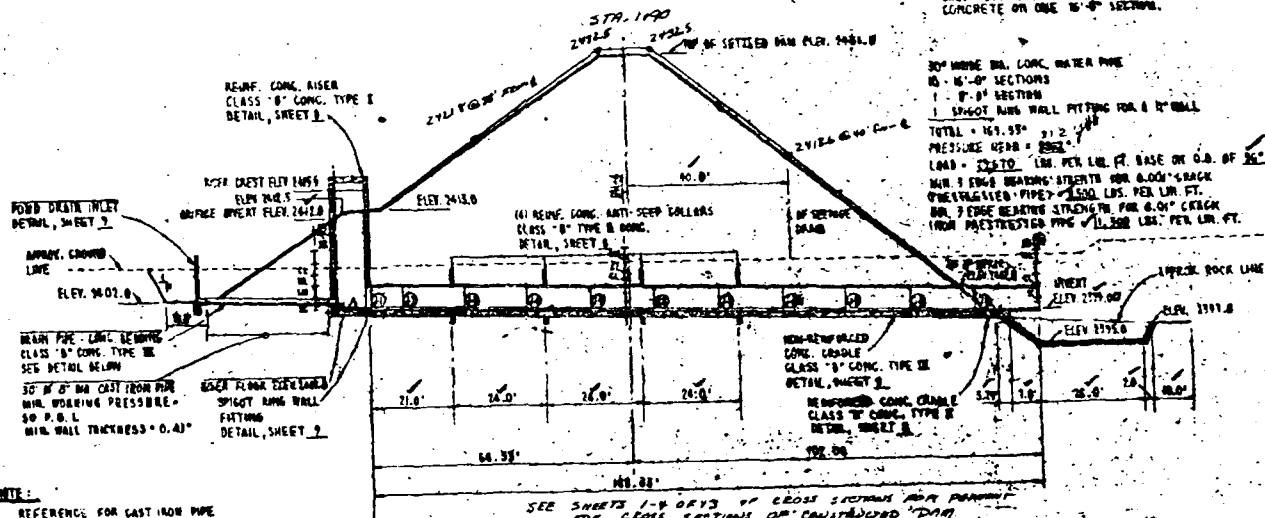


AS BUILT

SEEPAGE DRAIN DETAILS
LITTLE YOUGHIOGHENY WATERSHED
GARRETT COUNTY, MARYLAND
RESERVOIR NO. 1

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

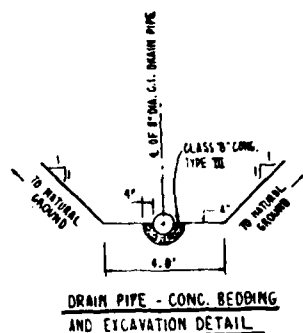
Designed *JH Bryant* Date *1/63*
Drawn *M. Niglich* Apr '63
Title *AS BUILT DRAINAGE*
Checked *E. KERSLAKE* 6-64
Sheet *1/3* of 10 Drawing No. *MD-414-P*



NOTE:
REFERENCE FOR CAST IRON PIPE
AND FITTINGS:
HANDBOOK OF CAST IRON PIPE
CAST IRON PIPE RESEARCH ASSOCIATION.

PROFILE ALONG E OF PRINCIPAL SPILLWAY

SCALE: HORIZ. 1" = 20.0' VERT. 1" = 10.0'

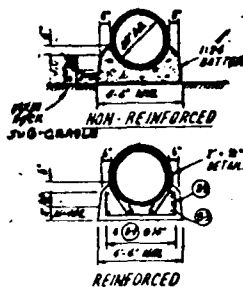


| COLLAR | DISTANCE FROM RIVER WALL | HIGHEST ELEV. OF 30" DIA PIPE BT OF COLLAR |
|--------|--------------------------|--|
| I | 21 ✓ | 2450.76 |
| II | 48 ✓ | 2460.67 |
| III | 69 ✓ | 2460.10 |
| IV | 83 ✓ | 2350.00 |

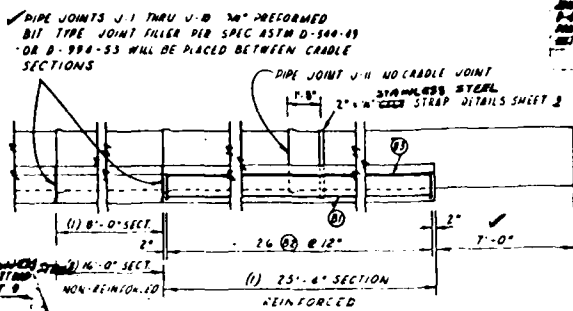
| JOINT | DISTANCE FROM STATION 0+00 | STREET ELEV. OF 10" DIA PIPE | GRADE |
|---------|-------------------------------|---------------------------------|-------|
| 1-0 | 0 | 2401.00 | |
| 1-1 | 8 | 2400.90 | |
| 1-2 | 24 | 2400.71 | |
| 2-3 | 49 | 2400.52 | |
| 2-5 | 90 | 2400.33 | |
| 3-6 | 72 | 2400.16 | |
| 4-7 | 83 | 2399.95 | |
| 5-8 | 104 | 2399.76 | |
| 6-9 | 150 | 2399.57 | |
| 7-10 | 196 | 2399.38 | |
| 8-11 | 252 | 2399.19 | |
| STATION | 150 | 2399.00 | |

SLOPE = 0.0130%

NOTE:
ABOVE DIMENSIONS FOR LENGTHS
OF PIPE ARE NOMINAL AND DO NOT
INCLUDE CREEP.



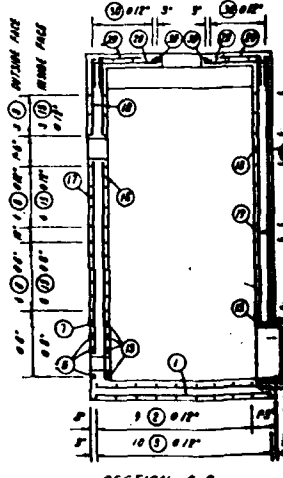
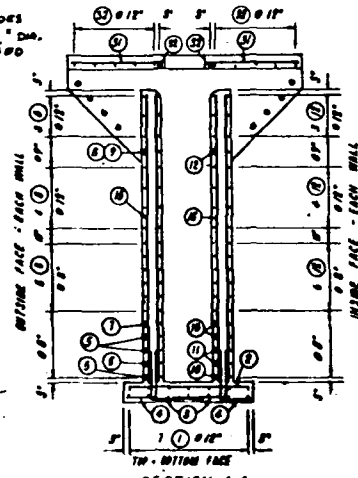
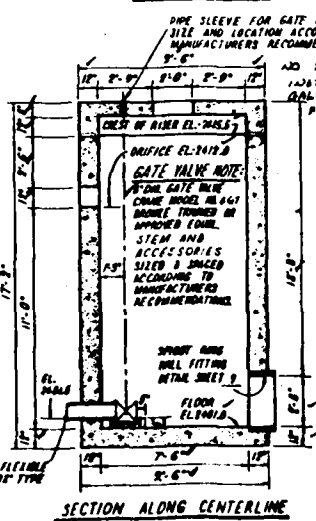
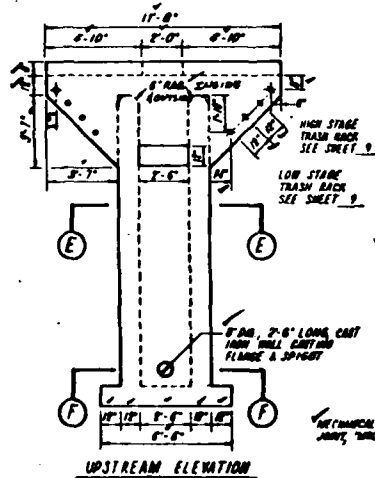
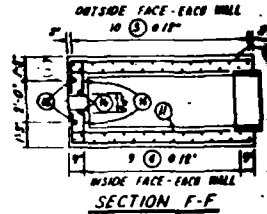
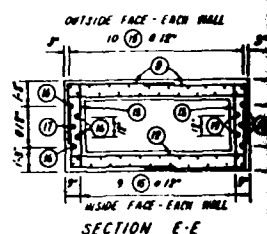
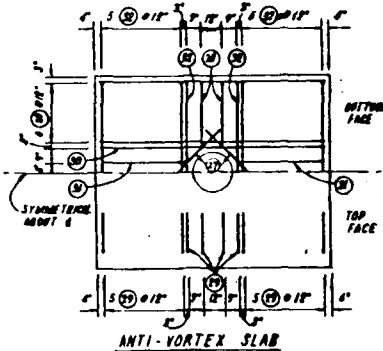
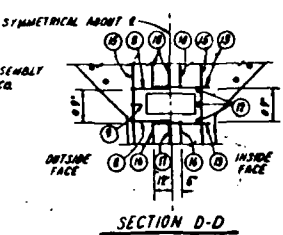
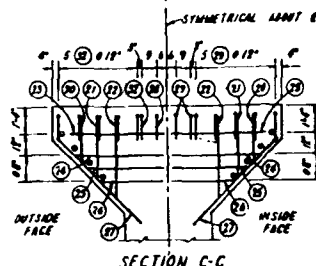
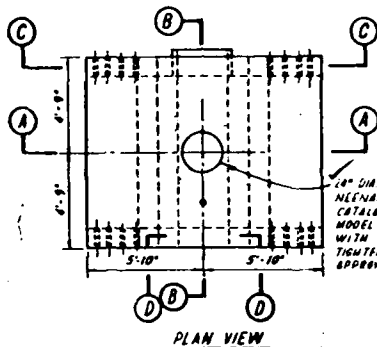
NON-REINFORCED & REINFORCED CONCRETE CRADLE DETAILS



DETAILS OF REINFORCED CONCRETE ANTI-SEED COLLAR

NOTE: NO TARTARUS USED
ANTI-SEED COLLAR SHALL BE
BUILT AND UNDER CRADLE, 500-GRAD
UNDER CRADLE SEE SHEET 6 & 7
OF PRELIMINARY SECTION FOR ADDITIONAL INFO.

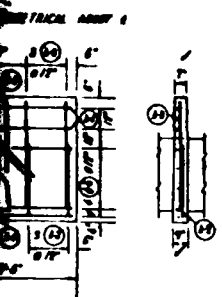
CONSTRUCTION JOINT



REINFORCED CONCRETE RISER DETAILS

GENERAL NOTES:

1. ALL CONCRETE SHALL BE OF PORTLAND CEMENT TYPE III OR EQUIVALENT.
2. ALL REINFORCING STEEL SHALL BE AGAINST THE CRADLE AND COVER. UNDER PAVES ARE 1 IN. OF 1" CLEAR COVER.
3. ALL REINFORCING SHALL BE 1/2" DIA.
4. ALL ELATED EDGES OF CRADLE UNLESS OTHER.

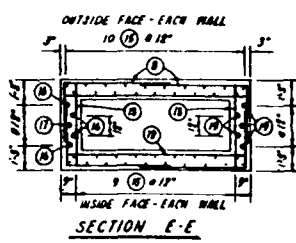


GENERAL NOTES:

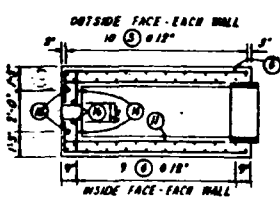
1. ALL CONCRETE SHALL BE CLASS "B" OF THE TYPE MIXED
2. PORTLAND CEMENT TYPE IS OR TYPE I WITH AN AIR-ENTRAPPING ADJUSTMENT
3. ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE FORMWORK SHALL HAVE A MIN. OF 3" CLEAR COVER. WHERE FORMS ARE USED ALL BARS SHALL HAVE 1 MIN. OF 3" CLEAR COVER.
4. ALL REINFORCING STEEL TO BE LAPPED A MIN. OF 30 BAR DIA.
5. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 60° CHAMFER UNLESS OTHERWISE NOTED

CONCRETE ANTI-SEEP COLLAR

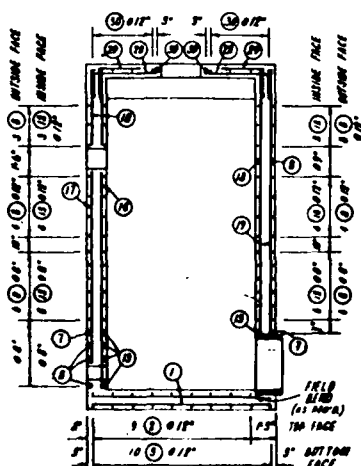
FOR USE, SEE REQUIRED
 MAKE SURE NOT
 CRACKLE, SOB-GRADLE
 BOLD, SEE SHEET 60017
 SECTIONS ARE ADDITIONAL SVPG.



SECTION E-E



SECTION F-F



SECTION B-B

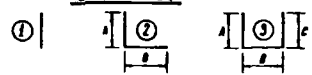
STEEL SCHEDULE

| LOCATION | BAR SIZE | LENGTH | TYPE | A | B | C | QUANTITY |
|----------|----------|--------|--------|---|--------|-------|----------|
| 1. RISER | M | 8 | 9'-0" | 1 | | | 16.00 |
| 2 | 8 | 6 | 6'-0" | 1 | | | 16.00 |
| 3 | 10 | 6 | 6'-0" | 2 | 5'-10" | 5'-0" | 16.00 |
| 4 | 10 | 5 | 5'-11" | 2 | 1'-6" | 5'-0" | 16.00 |
| 5 | 6 | 6 | 12'-1" | 2 | 5'-0" | 9'-1" | 16.00 |
| 6 | 8 | 8 | 10'-0" | 1 | 1'-7" | 9'-1" | 16.00 |
| 7 | 6 | 6 | 0'-6" | 1 | 3'-0" | 6'-6" | 16.00 |
| 8 | 10 | 5 | 0'-2" | 2 | 7'-10" | 5'-4" | 16.00 |
| 9 | 8 | 5 | 5'-10" | 2 | 0'-2" | 5'-4" | 16.00 |
| 10 | 6 | 6 | 9'-0" | 1 | | | 16.00 |
| 11 | 8 | 6 | 0'-0" | 1 | | | 16.00 |
| 12 | 10 | 5 | 9'-0" | 1 | | | 16.00 |
| 13 | 10 | 5 | 6'-0" | 1 | | | 16.00 |
| 14 | 2 | 8 | 1'-6" | 1 | | | 16.00 |
| 15 | 10 | 5 | 14'-0" | 1 | | | 16.00 |
| 16 | 4 | 8 | 10'-9" | 1 | | | 16.00 |
| 17 | 1 | 6 | 9'-6" | 1 | | | 16.00 |
| 18 | 5 | 6 | 3'-0" | 1 | | | 16.00 |
| 19 | 5 | 5 | 13'-7" | 1 | | | 16.00 |
| 20 | 8 | 5 | 2'-8" | 1 | | | 16.00 |
| 21 | 8 | 5 | 2'-8" | 1 | | | 16.00 |
| 22 | 8 | 5 | 4'-8" | 1 | | | 16.00 |
| 23 | 4 | 8 | 10'-0" | 1 | | | 16.00 |
| 24 | 6 | 5 | 9'-6" | 1 | | | 16.00 |
| 25 | 4 | 5 | 0'-2" | 1 | | | 16.00 |
| 26 | 4 | 8 | 6'-9" | 1 | | | 16.00 |
| 27 | 12 | 5 | 6'-0" | 1 | | | 16.00 |
| 28 | 6 | 6 | 4'-6" | 2 | 1'-3" | 3'-3" | 16.00 |
| 29 | 10 | 6 | 3'-5" | 2 | 1'-3" | 3'-0" | 16.00 |
| 30 | 10 | 5 | 9'-3" | 1 | | | 16.00 |
| 31 | 4 | 6 | 4'-6" | 1 | | | 16.00 |
| 32 | 18 | 6 | 11'-6" | 2 | 1'-3" | 9'-0" | 16.00 |

| | | | | | | | |
|-----------------|----|---|--------|---|--|--|-------|
| 33. COLLARS (2) | 12 | 5 | 1'-0" | 1 | | | 16.00 |
| 34 | 32 | 5 | 3'-6" | 1 | | | 16.00 |
| 35 | 24 | 5 | 5'-3" | 1 | | | 16.00 |
| 36 | 12 | 5 | 10'-4" | 1 | | | 16.00 |
| 37 | 32 | 5 | 5'-0" | 1 | | | 16.00 |
| 38 | 16 | 5 | 5'-0" | 1 | | | 16.00 |

| | | | | | | | |
|------------|----|---|---------|---|-------|-------|-------|
| 39. CHAIRS | 6 | 7 | 24'-10" | 1 | | | 16.00 |
| 40 | 26 | 4 | 5'-10" | 2 | 1'-8" | 3'-6" | 16.00 |
| 41 | 2 | 4 | 24'-10" | 1 | | | 16.00 |

BAR TYPES



STEEL QUAN.

NO. 4 BARS 301.25 LBS. 13.5 LBS.
 NO. 5 BARS 284.25 LBS. 17.8 LBS.
 NO. 6 BARS 443.50 LBS. 27.7 LBS.
 NO. 7 BARS 285.50 LBS. 17.8 LBS.
 TOTAL 1,414.50 LBS.

CONCRETE QUAN.

CLASS "B" TYPE I 18.0 CU. YD.
 CLASS "B" TYPE II 18.0 CU. YD.
 CLASS "B" TYPE III 18.0 CU. YD.

AS BUILT



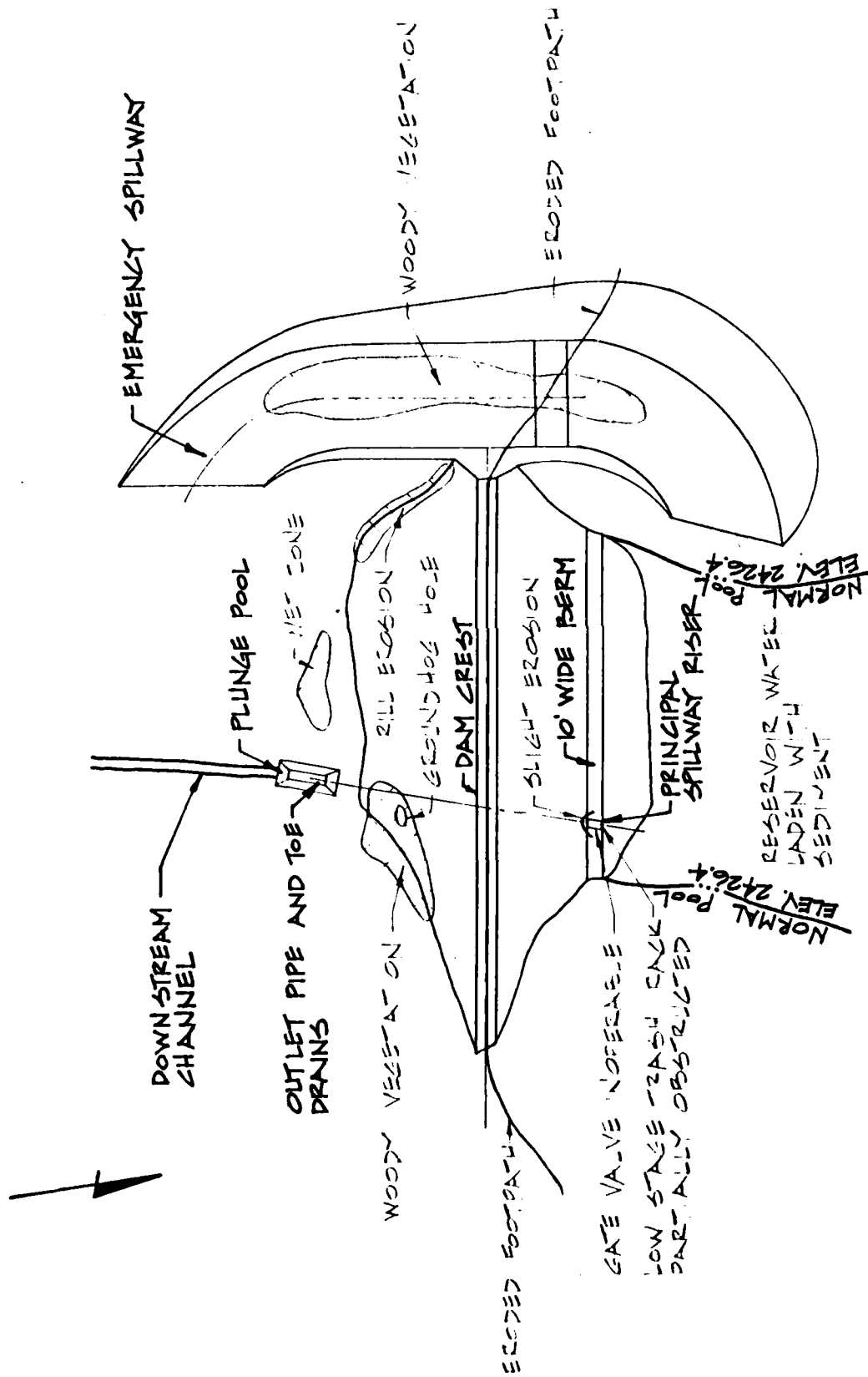
STRUCTURAL AND REINF STEEL DETAILS
 LITTLE YOUGHIOGHENY WATERSHED
 GARRETT COUNTY, MARYLAND
 RESERVOIR NO. 1

U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed: J.N. BRYANT Date: 1/63
 Drawn: C.E. FORD 1/63
 Trans: J.N. BRYANT 1/63
 Checked: J.N. BRYANT 1/63

Approved by: [Signature] Date: 1/63
 Title: [Blank]
 Sheet: 8 of 8
 Drawing No: MD-44-P

APPENDIX A
FIELD SKETCH AND VISUAL OBSERVATIONS CHECKLIST



FIELD SKETCH LITTLE YOUGHIOGHENT SITE #1

AI

VISUAL OBSERVATION CHECKLIST

Name Dam Little Youghiogheny County Garrett State Maryland National ID # MD 44
 Site No. 1
 Type of Dam Earthfill Hazard Category High - Class 1
 Date(s) Inspection 4/10/79 Weather Clear, cold Temperature 50°
 Inspection Review Date 5/24/79 (Ackenheil & Associates personnel only.)
 Pool Elevation at Time of Inspection 2,426.4* Tailwater at Time of Inspection Normal M.S.L. _____
 *Pool at riser orifice level.

Inspection Personnel:

Ackenheil & Associates

Timothy Debes
 James Hainley
 Michael McCarthy

Water Resources Administration

Jeffrey Smith
 Thomas Moynahan

Soil Conservation Service

Bill DeBarry
 Walt Payte

Recorder Timothy Debes

EMBANKMENT

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS* |
|--|--|-----------------------------|
| SURFACE CRACKS | None observed, dense grass cover. | |
| UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE | None observed. | |
| SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES | An eroded footpath about 0.4 ft. deep, extends across the dam crest and emergency spillway side slopes and channel. Minor rill erosion is evident along the right downstream embankment junction. Erosion is also evident on the upstream slope berm at normal pool level, around the downstream side of the principal spillway riser. | |
| VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST | No vertical or horizontal misalignment was observed. | |
| RIPRAP FAILURES | N/A | |

*REFER TO REPORT SECTIONS 3 AND 7

EMBANKMENT

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|---|---|----------------------------|
| SETTLEMENT | None evident. | |
| JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM | Minor rill erosion evident along right downstream embankment junction. Embankment junctions are vegetated with grass and appear in good condition. | |
| ANY NOTICEABLE SEEPAGE | Wet zone located approximately 180 ft. right of the outlet plunge pool. Zone attributed to spring activity. | |
| STAFF GAGE AND RECORDER | None. | |
| DRAINS | Two (2) 6 in. dia. toe drains exit the dam embankment at the location of the concrete outlet pipe. Each seepage drain outlet had an estimated discharge of less than 1 gpm. The right (west) drain pipe is partially obstructed by an iron precipitate. | |

OUTLET WORKS

(Pond Drain)

| VISUAL EXAMINATION OF | | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|--|--|---|----------------------------|
| CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT | | None observed. | |
| INTAKE STRUCTURE | | Gate valve not operable. Stem shaft broken. Low stage trash rack and riser orifice opening partially clogged with debris. | |
| OUTLET STRUCTURE | | Concrete outlet pipe and cradle, and seepage toe drains in good condition. Plunge pool lined with riprap and stable. No flow obstructions in plunge pool. | |
| OUTLET CHANNEL | | Exit channel bottom and side slopes stable. Channel banks are vegetated with a dense grass and slope 3H:1V. Downstream channel underpasses Old Deer Park Road via a 48 in. dia. concrete culvert. | |
| EMERGENCY GATE | | N/A | |

UNGATED SPILLWAY

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|-----------------------|--|----------------------------|
| CONCRETE WEIR | N/A | |
| APPROACH CHANNEL | Approach channel and control crest partially covered by woody vegetation. An eroded footpath extends across the channel bottom and side slopes. Spillway channel cut into natural earth and has adequate erosion protection. | |
| DISCHARGE CHANNEL | Mid-section of discharge channel covered by woody vegetation. | |
| BRIDGE AND PIERS | None. | |

GATED SPILLWAY

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|----------------------------------|--------------|----------------------------|
| CONCRETE SILL | N/A | |
| APPROACH CHANNEL | N/A | |
| DISCHARGE CHANNEL | N/A | |
| BRIDGE AND PIERS | N/A | |
| GATES AND OPERATION EQUIPMENT | N/A | |

INSTRUMENTATION

| <u>VISUAL EXAMINATION OF</u> | <u>OBSERVATIONS</u> | <u>REMARKS OR RECOMMENDATIONS</u> |
|------------------------------|---------------------|-----------------------------------|
| MONUMENTATION/SURVEYS | None | |
| OBSERVATION WELLS | None | |
| WEIRS | None | |
| PIEZOMETERS | None | |
| OTHER | N/A | |

RESERVOIR

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|-----------------------|---|----------------------------|
| SLOPES | Reservoir slopes have gentle to moderate inclinations, are well vegetated, and appear stable. No evidence of landslides, embankment sloughing, or shoreline erosion was observed. | |
| SEDIMENTATION | Reservoir water heavily laden with silt and sediment material. Turbidity attributed to following sources: | |
| | 1. Fly ash and soil stockpiles located next to Cherry Glade stream channel. | |
| | 2. Construction of new homes in immediate reservoir area. | |

DOWNSTREAM CHANNEL

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|---|--|----------------------------|
| CONDITION (OBSTRUCTIONS, DEBRIS, ETC.) | None observed. | |
| SLOPES | Channel side slopes are vegetated with grass and appear stable. | |
| APPROXIMATE NO. OF HOMES AND POPULATION | Approximately sixteen (16) commercial and residential establishments are located in the downstream floodplain between the dam site and the Little Youghiogheny River confluence. | |

APPENDIX B
CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

LITTLE YOUGHIOGHENY
SITE NO. 1

NAME OF DAM

ID # MD 44

| ITEM | REMARKS |
|---|--|
| AS-BUILT DRAWINGS | As-built drawings available from Soil Conservation Service. See Plate Nos. 1 through 6. |
| REGIONAL VICINITY MAP | See Appendix E. U.S.G.S. 7.5 minute quadrangle map showing dam site location. |
| CONSTRUCTION HISTORY | Dam was designed and constructed under the supervision of the Soil Conservation Service. Construction was completed in September 1964. |
| TYPICAL SECTIONS OF DAM | See Plate Nos. 2, 3, 4, and 5 for sections of dam. |
| OUTLETS - PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS | See Plate Nos. 5 and 6 for details of principal spillway riser and outlet pipe. Available in design report. |
| PAINT/FALL/PERCEP/OIP RECORDS | None available. |

| ITEM | REMARKS |
|---|---|
| DESIGN REPORTS | Little Youghiogheny Site No. 1, design report prepared by the Soil Conservation Service, April 1963. Report may be obtained from Soil Conservation Service or the Maryland Water Resources Administration. |
| GEOLOGY REPORTS | Geology report included in the above identified document. Report was prepared by J. H. Ferguson and R. F. Fonner, Soil Conservation Service geologists. |
| DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES | Soil Conservation Service Design Report includes stage-storage and discharge rating curves, hydrographs, and flood routing calculations. Stability analysis also included in design report. No seepage analysis was found in the design report. |
| MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD | Design report includes test boring and test pit logs. Laboratory classifications, compaction, consolidation, and shear strength test results are also included. |
| POST-CONSTRUCTION SURVEYS OF DAM | None reported. |
| BORROW SOURCES | See Plate No. 1 for location of borrow sources. |

| ITEM | REMARKS |
|--|---|
| MONITORING SYSTEMS | None |
| MODIFICATIONS : : : | During construction, 4 in. dia. tile drain installed in the valley floor downstream of dam. See Plate No. 2. Riprap gutter shown in Plate No. 2 was omitted because of final grade topography. |
| HIGH POOL RECORDS : : : | None reported. |
| POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS : : : | None reported. |
| PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS: : : | None reported. |
| MAINTENANCE OPERATION RECORDS: : : | Annual maintenance and operation inspection reports available from Soil Conservation Service district office in Oakland, Maryland. |

| ITEM | REMARKS |
|--|---|
| SPILLWAY PLAN | See Plate Nos. 2 and 3 for details of emergency spillway. Design calculations included in Soil Conservation Service design report. |
| SECTIONS | |
| DETAILS | |
| OPERATING EQUIPMENT PLANS & DETAILS | See Plate Nos. 5 and 6 for details of reservoir drain. |
| SPECIFICATIONS | Construction and Material Specifications for Little Youghiogheny River Watershed, Flood Detention Structure No. 1, prepared by the Soil Conservation Service and available with design report. |
| MISCELLANEOUS | Maryland State Waterway Obstruction Permit, dated June 5, 1963. Annual Inspection Reports dated May 12, 1966, May 9, 1977, August 2, 1978. State of Maryland, Department of Water Resources, letter from M. L. Rodevick dated July 19, 1977. Letter makes reference to illegal filling of Cherry Glade Run by Bauer Lumber Company. |

APPENDIX C

HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA
AND CALCULATIONS

LITTLE YOUGHIOGHENY SITE NO. 1
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Approximately 70% pasture, 20% cultivated,
10% woodlands.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 2,412.0 ft. (23 ac.-ft.)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 2,431.5 ft. (346 ac.-ft.)

ELEVATION MAXIMUM DESIGN POOL: 2,426.4 ft.

ELEVATION TOP DAM: 2,431.5 ft.

EMERGENCY SPILLWAY

- a. Elevation 2,422.8 ft.
- b. Type Trapezoidal open earth channel
- c. Width 65.0 ft.
- d. Length 380.0 ft., curved
- e. Location Spillover Right (west) abutment
- f. Number and Type of Gates None

OUTLET WORKS

- a. Type Reinforced concrete intake structure with 30 in. dia. R.C. outlet pipe
- b. Location 65 ft. upstream of embankment centerline, 35 ft. west of left (east)
- c. Entrance Inverts Low stage-EI. 2,412.0; high stage-EI. 2,415.5 abutment
- d. Exit Inverts EI. 2,399.0
- e. Emergency Drawdown Facilities None.

HYDROMETEOROLOGICAL GAGES

- a. Type None
- b. Location None
- c. Records None

MAXIMUM NON-DAMAGING DISCHARGE Unknown

PAD
7.0.79
JED
11/10/79

PROJECT NO. _____

Little Youghiogheny Site No. 1 - Hydrology

SHEET NO. C-2 OF _____

1. Determine Rainfall amount for PMF Design Storm.

PMF rainfall for Garrett Co., Maryland = 26.8 in./6 hr.

obtained from "Design of Small Dams" - pg. 48
by U.S. Dept. of Interior.

Data based on Hydrometeorological Report No. 33
National Weather Service

Watershed Area = 0.63 miles²

Reduction Factor = 0.8 (for watershed area < 10 mi²)

Adjusted PMF rainfall = $0.8 \times 26.8 = 21.4$ in./6 hr.

Adjusted $\frac{1}{2}$ PMF rainfall = $\frac{1}{2} \times 21.4 = 10.7$ in./6 hr.

APPENDIX D
PHOTOGRAPHS

PHOTOGRAPH 1

Overview of reservoir pool, shoreline, and side slopes.

PHOTOGRAPH 2

Embankment crest and side slopes.

PHOTOGRAPH 3

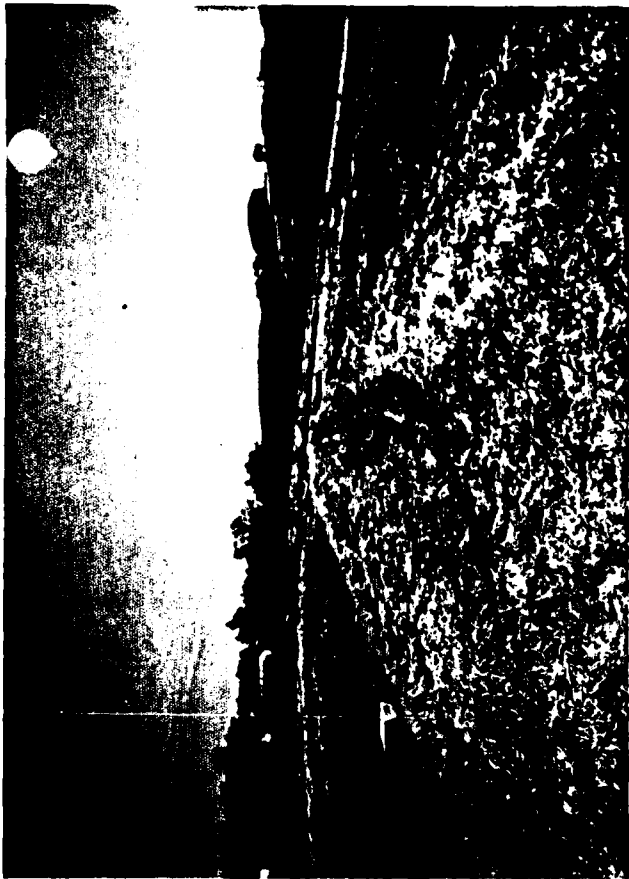
Upstream emergency spillway channel.

PHOTOGRAPH 4

Downstream emergency spillway channel with woody vegetation.



1



2



3



4

PHOTOGRAPH 5

Principal spillway intake structure.

PHOTOGRAPH 6

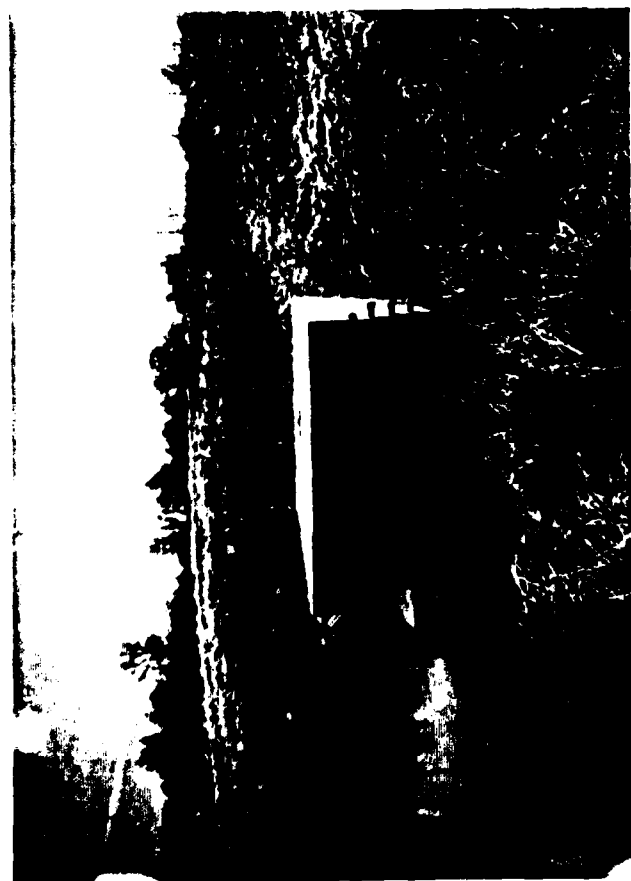
Principal spillway outlet pipe, seepage drains, and plunge pool lined with riprap.

PHOTOGRAPH 7

Exit stream channel and 48 in. dia. culvert located under Old Deer Park Road.

PHOTOGRAPH 8

Wilson Run stream channel, downtown Oakland.



5



6

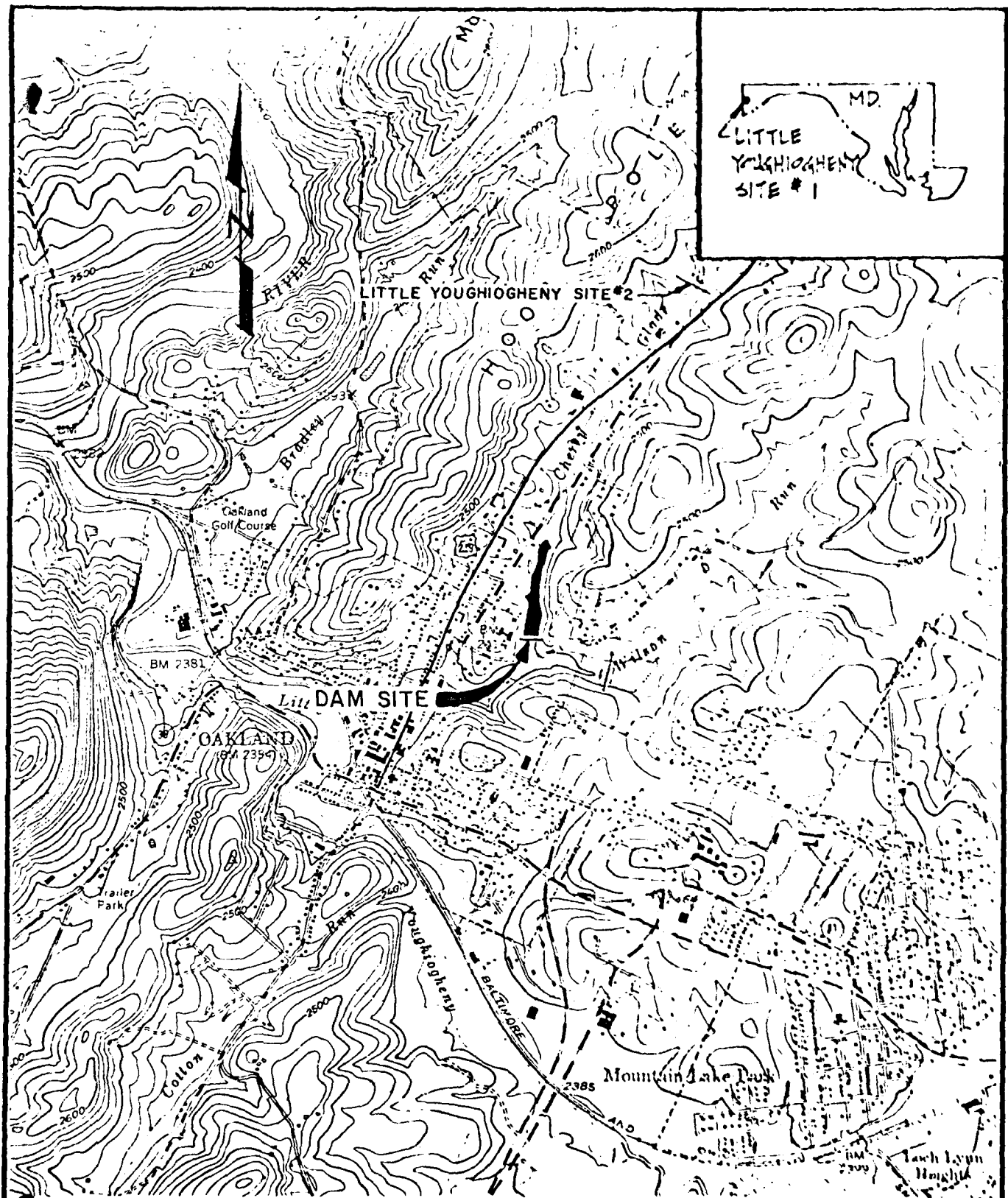


7



8

APPENDIX E
REGIONAL LOCATION PLAN



| | | | |
|---------------------|------------|--|---|
| DATE: JULY 13, 1979 | | NATIONAL DAM INSPECTION PROGRAM | LOCATION PLAN OF LITTLE YOUGHIOGHENY SITE #1 |
| SCALE: 1:24000 | | | |
| DR: JLM | CK: T.E.D. | ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS BALTIMORE, MD. | |
| DWG. NO. E1 | | | |

APPENDIX F
REGIONAL GEOLOGY

LITTLE YOUGHIOGHENY SITE NO. 1
NDI I.D. NO. MD 44
REGIONAL GEOLOGY

Little Youghiogheny Site No. 1 is located in the Allegheny Plateau Physiographic Province. The predominant macrostructure of the region is the northeast trending Deer Park Anticline which extends through eastern Garrett County into Pennsylvania. The dam structure is located on the western flank of the Deer Park Anticline within the Hampshire Formation.

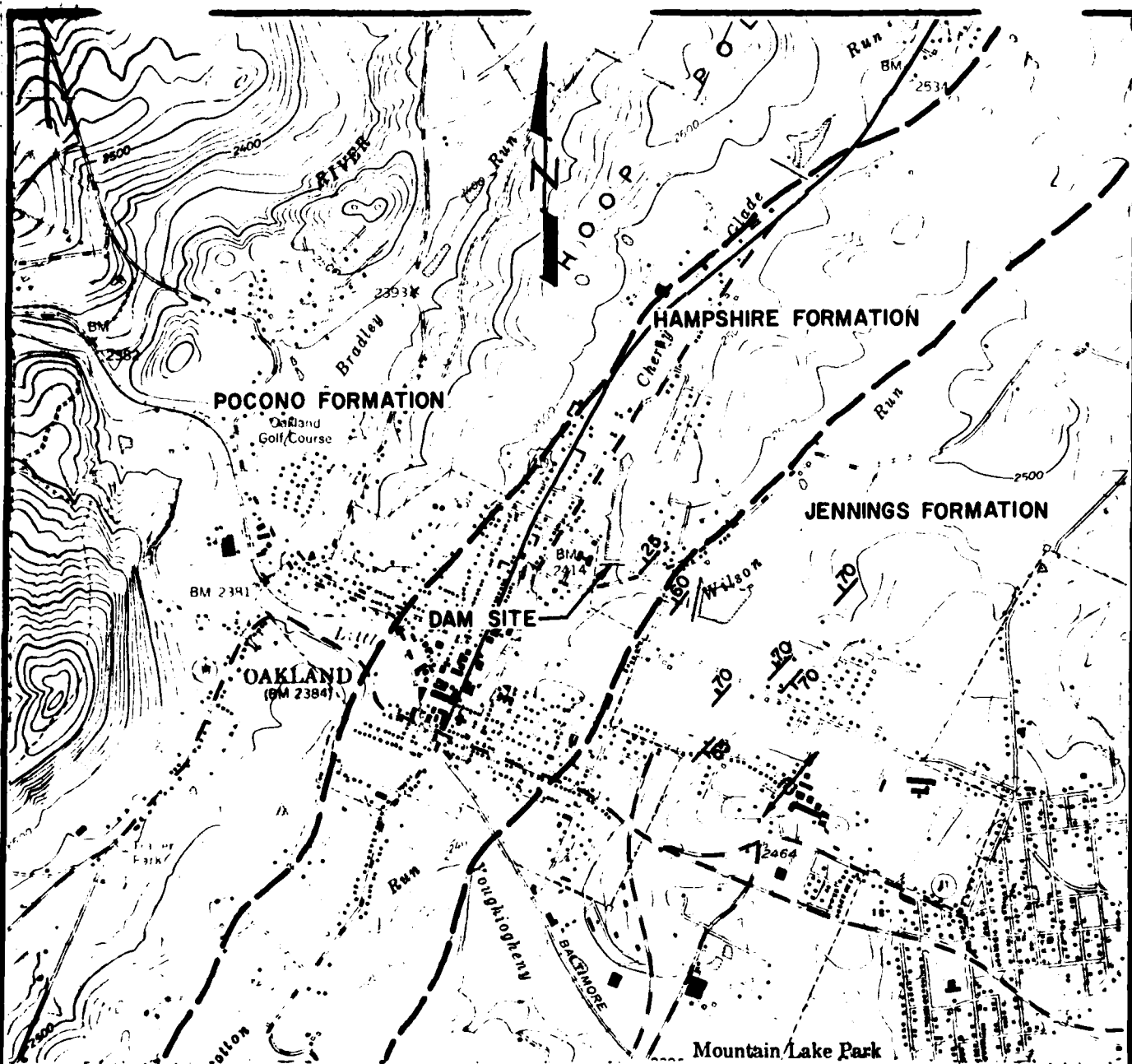
The Upper Devonian Hampshire Formation consists of non-marine brownish red sandstone alternating with thick beds of red and occasionally thin beds of green shale. The Pocono Formation is composed of strongly crossbedded sandstones interbedded with siltstones and shales. The Jennings Formation consists of interbedded marine shale, sandstone, and siltstone.

The bedding at the dam site strikes approximately N 28° E and dips approximately 30° NW. Bedding strikes the embankment centerline at approximately a 28° angle.

The left and right (east and west) dam abutments have inclinations of 20% and 44%, respectively. The floodplain is nearly flat and contains sediment accumulated from a former dam.

References

- Ferguson, J. H., 1961, Geology Report of Little Youghiogheny River Watershed Site No. 1.
- Maryland Geological Survey, 1953, reprinted 1965, Geologic Map of Garrett County.
- Maryland Geological Survey, revised 1961, reprinted 1966, Bulletin 19, Geography and Geology of Maryland.



OAKLAND QUADRANGLE, GARRETT COUNTY, MARYLAND

SCALE: 0 1/2 MILE 1: 24000

CONTOUR INTERVAL 20FT. DATUM IS MEAN SEA LEVEL

— — — — — FORMATION CONTACT

170 STRIKE AND DIP

— 2 — OVERTURNED BEDS

DATA OBTAINED FROM MARYLAND GEOLOGICAL SURVEY'S GEOLOGIC MAP OF GARRETT COUNTY, 1953
REPRINTED 1965

DATE: JULY 2, 1979

SCALE: AS SHOWN

DR: JLM CK: T.E.D.

DWG. NO. F 2

NATIONAL DAM INSPECTION PROGRAM

ACKENHEIL & ASSOCIATES
CONSULTING ENGINEERS
BALTIMORE, MD.

SITE GEOLOGY
OF LITTLE
YOUGHIOGHENY
SITE #1